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JPRS-UTR-86-017

20 AUGUST 1986

# USSR Report

## TRANSPORTATION

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USSR REPORT  
TRANSPORTATION

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CIVIL AVIATION

CEMA CIVIL AVIATION COMMISSION MEETS IN BERLIN

Moscow VOZDUSHNYY TRANSPORT in Russian 24 May 86 p 1

[TASS article: "Session of the CEMA Standing Commission for Civil Aviation"]

[Text] Berlin, 23 May--A regular session of the CEMA Standing Commission for Civil Aviation was held here from 20 through 23 May 1986 on collaboration in the civil aviation field. Participating in it were delegations from the People's Republic of Bulgaria, Hungarian People's Republic, Socialist Republic of Vietnam, GDR, Cuba, Mongolian People's Republic, Polish People's Republic, Socialist Republic of Romania, USSR, CSSR and the Socialist Federal Republic of Yugoslavia.

The Commission examined tasks stemming from decrees of the CEMA session and the Council Executive Committee and outlined steps to implement them. Particular emphasis was placed on tasks stemming from resolutions of the Economic Summit Conference of CEMA member countries. The Commission gave much attention to questions of further improvement of cooperation of CEMA member countries on international air routes and an improvement in effectiveness of the operational and economic activity of their aviation enterprises.

The session discussed a report on the operation of international air routes of CEMA member countries for 1985 and considered questions of flight safety and measures to prevent air accidents in air enterprises of CEMA member countries. Questions of economic-production and scientific-technical collaboration of CEMA member countries for the upcoming five-year period occupied an important place in the Commission's work. The Commission concluded elaboration of an agreement on mutual recognition of state certificates of engineering-technical personnel of air enterprises parties to the agreement in matters of cooperation in the field of operational, commercial and financial activity among air transport enterprises. The general agreement on organization of flows in the unified air traffic control system of European CEMA member countries was signed. Corresponding resolutions were adopted on all matters considered.

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## CIVIL AVIATION

### OFFICIALS ON STATE CIVIL AVIATION INSTITUTE WORK

Moscow GRAZHDANSKAYA AVIATSIYA in Russian No 5, May 86 pp 16-19

[Article by GRAZHDANSKAYA AVIATSIYA special correspondent I. Kazanskiy:  
"Scientists Explore"]

[Text] This is the State Scientific Research Institute of Civil Aviation. Here, in the main headquarters of sectorial science, a creative search goes on for ways to improve work efficiency and accelerate scientific and technical progress in air transport production, and prospects for its development are forecast on the basis of the scientists' research. The Institute collective is working with determination to fulfill and adopt many important developments which ensure an improvement in the indicators of civil aviation work and provide a substantial economic and social effect.

Aleksandr Aleksandrovich Subbotin, chief of GosNII GA [State Scientific Research Institute of Civil Aviation]:

"Work aimed at Aeroflot's retooling is a focus for us. Included in this work are operational and control tests and an examination of preliminary designs and mock-ups of new aircraft and helicopters. Tests have concluded on the new An-28 and Tu-154M aircraft with the more economical D-30KU engines, we have examined mock-ups of the Tu-204 and L-610 aircraft and Ka-126 helicopter, and we are performing a number of other jobs on new equipment."

But even those aircraft and helicopters which already are in service on Aeroflot routes do not escape the view of institute specialists. For example, flight tests of considerable scope and complexity recently were conducted on the Il-76 and Tu-154 aircraft and on the Ka-32 helicopter at mountain airfields, on snowcovered runways, with low coefficients of cohesion of tires with the surface, and under conditions of high and very low temperatures. These tests make it possible to expand the spectrum of aircraft operating conditions. There was also a successful reduction in restrictions on temperature of reliable start of the auxiliary power plant, for a cross wind, and for the coefficient of cohesion for the Yak-42 aircraft, which contributed to a substantial expansion in the network of base airports and air routes on which it is operated. In general it can be said that flight tests are

conducted on practically all types of aircraft. The results serve as a source for producing scientifically grounded recommendations aimed at improving the efficiency of equipment operation.

The collective of the sector's science center is making its contribution toward solving many production problems. The Institute's research departments, its Riga Department and the Krasnodar Branch are performing comprehensive studies on various aspects of flight safety, reliability, and methods of maintaining and repairing aviation equipment, systems and power plants; they are studying problems of mechanization and automation and use of aircraft in the national economy; and they are resolving problems of the sector's technical-economic and social development, scientific organization of labor, and production management.

The scientists' attention also is drawn to the possibility of improving the effectiveness of scientific exploration itself. This is reflected in the organization of projects for mathematical modeling and automation of research. The Institute's computer facility plays a major role here. Modern computers (including micro-computers) and a remote data processing system based on a display station have been placed in operation here of late. In order for the computers to be used effectively and for them to be able to solve a broad category of problems, we place much emphasis on their systemwide support and software. It can be said without exaggeration that the higher the degree of skilled computer application, the higher is the work quality and scientific and practical importance. In many cases it is simply no longer possible to get by without computer equipment, such as in modeling production activities of the sector and its elements, modeling flight conditions and effects of the environment on them, or making a comparative analysis of flight equipment characteristics. The scope of computer application is continuously growing, so that today's scientist is simply inconceivable without computer skills.

There is an extraordinarily broad range of topics of research and development projects with which the collective of the State Scientific Research Institute entered the 12th Five-Year Plan. A program base providing goal orientation in planning projects became the compass in this diversity of topics, directions and specialists' scientific interests.

The fundamentals are contained in the "All-Union Scientific-Technical Program," which includes sectorial programs on fuel economy, aircraft service life, reliability, flight simulation, aircraft simulators, planning and the economic mechanism. The "Long-Range Plan of Technical-Economic and Social Development of the State Scientific Research Institute of Civil Aviation for 1986-1990 and for the Period up to the Year 2000" has been drawn up and approved for their execution.

These programs orient the collective toward intensive, productive creative work. The work must have no place for lack of organization, inertness, and insufficient responsibility for the assigned job. This was said by literally everyone with whom I had occasion to chat. Those with whom I spoke noted with regret that, alas, the symptoms of these ailments were not rare in the past. The State Scientific Research Institute of Civil Aviation was criticized for the poor effectiveness of its work.

It should be noted to the Institute collective's honor that it looked into the reasons for the failures self-critically. The situation is being corrected. True, not all illnesses have been fully cured as yet. For example, one of them appeared while operating tests of the An-28 were being performed. The diagnosis lay on the surface, as the saying goes: insufficient personal responsibility of some specialists, negligence, hopes placed on the practice of adjusting the plan (of which there is a sad memory), and attempts to hide behind "objective difficulties." There is no question that objective difficulties exist and there are instances where the plan requires adjustment: in scientific exploration not everything is subject to precise forecasting. But this is more the exception than the rule, and in any case it is no justification for the fact that, for example, the dates for adoption of the results of 55 scientific projects were changed for the Institute last year, with four of them being excluded from the plan entirely. The primary reason for these adjustments is the lack of readiness of particular phases of the work or, in other words, the absence of precise organization and close coordination with aircraft equipment developers. But on the other hand, rigid planning in a job such as research work sometimes does not justify itself. There has been a suggestion to shift to a more flexible planning system: with final dates given for introduction of new technology, to plan the phases of its completion depending on the actual readiness dates of models for tests. But it is premature to speak about this before completion of the development of a full set of normative documents which precisely define the responsibility of the client (the Ministry of Civil Aviation) and developer (the Ministry of the Aviation Industry) for timely and quality performance of work in all stages of development, creation, testing and operation of new and modified aircraft.

For now there is no precise coordination of the work of Institute subunits and leading specialists directly engaged in scientific-technical accompaniment of newly created aviation equipment with subunits and specialists studying problems of operation. As a result there is noncoordination of action, a delay in dates, and poor efficiency.

And not everything has been done as yet in the area of strengthening labor discipline and assuring maximum labor productivity.

I had occasion to hear complaints about difficulties of an "external" nature as well. With all the intensity of work plans, each year Institute associates spend some 30,000 man-days on various kinds of above-plan operational assignments which come directly as "hot spots" appear and introduce real turmoil.

A real paper flow of documents also takes up a large amount of time. Up to 100 serious documents sometimes requiring much time come to individual workers in a day's time. For example, all aviation equipment modification bulletins pass through the State Scientific Research Institute of Civil Aviation (although the GOST [state standard] doesn't provide for this), as do training programs (but the fact is that there is not a single pedagog/methods specialist here) and a mass of other papers. No one manages or controls the

paper flow. In essence the established practice is nothing more than a shifting of responsibility from the immediate performer to the shoulders of visaing specialists.

The final accord, meaning and end result of scientific work is the adoption of an innovation. This was the subject of discussion in several mini-interviews with Institute specialists.

Candidate of Technical Sciences Valeriy Mikhaylovich Buryakov:

"We are working on problems of fuel economy, but our suggestions are not being fully implemented. Why develop something new if we don't use what we already have?"

Department Chief Roman Ivanovich Likhachev:

"Nondestructive control is the basis for a transition to more progressive methods of aircraft equipment maintenance and repair. It is a serious subject requiring good instrumentation. But Minpribor [Ministry of Instrument Making, Automation Equipment, and Control Systems] does not assure high quality of equipment and Minaviaprom [Ministry of the Aviation Industry] doesn't give us enough help. As a result there is an extremely insignificant output of practical results."

Doctor of Technical Sciences Vadim Iosifovich Yampolskiy:

"Development of diagnostic programs and the methods and means of diagnostics requires the organization of laboratories at air maintenance facilities and repair plants. While in the first case they are still in operation (through the efforts of enthusiasts) although they are experiencing great difficulties because of a lack of equipment, in the latter case they are essentially absent. For this reason results from using the recommendations of science are extremely poor."

Candidate of Technical Sciences Yakov Nisonovich Peyko:

"The restoration of tires saves considerable funds and scarce materials: a restored tire is two-thirds the cost of a new tire (with the very same life), but no more than 5-7 percent of tires are restored."

Candidate of Technical Sciences Georgiy Dmitriyevich Savykov:

"The modeling of special instances of flight is an important means for improving safety, but because of the low scale of research (there is insufficient computer equipment support) we have no opportunity to achieve mass adoption of recommendations in day-to-day practice."

As State Scientific Research Institute of Civil Aviation Deputy Chief Viktor Vasilyevich Gorlov said, many problems will be resolved with adoption of cost-accounting methods in research practice. The Institute is seriously preparing for a transition to that system. Participation in drawing up appropriate provisions and normative documents has been planned. Beginning with this

year, there is a constant analysis and improvement of the research and development project management system as applied to cost-accounting and an experiment was organized to work out this system.

Cost-accounting also should help achieve higher effectiveness of scientific exploration. The following task has been placed on the agenda: the collective's socialist pledges provide for increasing the return from each ruble invested in science to four rubles by the end of the five-year plan (an amount of 3.1 rubles now has been achieved).

It stands to reason, however, that cost-accounting is not a panacea or an end in itself, but only one of the means in a set of steps aimed at achieving the great heights of sectorial science. The principal efforts of the Institute collective in the first year of the 12th Five-Year Plan are focused on accomplishing tasks set by the 27th CPSU Congress. Active organizational work has unfolded aimed at improving the productivity of scientific labor and results of research and development, and at strengthening production discipline. Resolution of the collective's social development problems is promoting the attainment of high goals.

Aleksandr Aleksandrovich Subbotin summed up the conversation: "Our principal task lies in a radical improvement of the work of accelerating S&T progress in civil aviation. The pivotal direction on which the collective's main efforts must be concentrated is scientific accompaniment of the creation and placement in operation of aircraft which are not inferior in engineering level to the highest world achievements; a further increase in safety and regularity of flights and in the sector's work effectiveness; and a comprehensive conservation of fuel and energy resources."

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## CIVIL AVIATION

### OFFICIAL ON CIVIL AVIATION SECTOR PERSONNEL SHORTAGES

Moscow VOZDUSHNYY TRANSPORT in Russian 6 May 86 p 3

[Interview with Viktor Antonovich Parkhimovich, deputy chief of UUZ MGA [Educational Institutions Administration of the Ministry of Civil Aviation], by VOZDUSHNYY TRANSPORT correspondent V. Ksenofontov, date and place not specified, under "Prepare Worthy Replacements" rubric: "With a Thought About Tomorrow"]

[Text] Each year the collectives of civil aviation schools and universities send thousands of their graduates into Aeroflot's maintenance enterprises. An unpleasant trend has been seen in the school-aviation educational institution-production chain at the present time toward a reduction in the number of persons entering engineering and technical specialties. The editors asked Deputy Chief of UUZ MGA V. Parkhimovich to tell about what steps are being taken to resolve this problem.

[Question] Viktor Antonovich, in their letters our readers who are school and institute instructors and aviation enterprise workers point out the sharp decrease in the number of graduating students desiring to learn the aviator's trade. What is this connected with, in your view?

[Answer] I have to admit that those times are past when there was a competition of 8-10 persons or more for one place. Last year only three aspirants remained for every two places after the medical commission and vocational-psychological selection even for flight schools.

A number of factors served as the cause of this phenomenon, and one can regard the principal one as the general unfavorable demographic situation in the country involving the given age group. But no objective reasons can be used to justify our own miscalculations, because of which the plan of acceptance for technical specialties was not fulfilled in the majority of zones last year. For example, fewer than 60 percent of the planned number of graduating students were sent by acceptance commissions of the Krasnoyarsk Zone (the commission chairman is Comrade S. Krokhov, chief of the Krasnoyarsk Air Technical School) and Volga Zone (the commission chairman is V. Gotsev, deputy chief of the Kirsanov School).

At the very least, the personnel of some administrations are behaving shortsightedly in resolving problems involving acceptance into educational institutions. For example, last summer Personnel Department Chief A. Melchukova and Deputy Chief Engineer A. Ugrinovich of the East Siberian Administration withdrew from accomplishing this task. These persons, whose primary duty was to assist the acceptance commission in any way, avoided active help, referring to their workload and believing that these matters were not within their competence. Such an attitude toward fulfilling the very important task of preparing young replacements for aviators already was established long ago in that administration. Nevertheless, requests alluding to the growing need for aircraft specialists are sent from here each year for a large number of school and university graduates. It must be said that the situation in the East Siberian Administration also is typical of selection commissions of the Ukrainian, Krasnoyarsk, Volga, Kazakh and other civil aviation administrations. At the same time, matters were well arranged in the Yakutsk and Far East administrations and in UGATs [Civil Aviation Administration of the Center]. Here plans for manning were completely fulfilled, which guarantees a return flow of young specialists in a few years.

[Question] The existing unfavorable situation requires the use of new forms and methods of work in the vocational orientation of young people. In your view, where are the unused reserves in this direction?

[Answer] The foundations for successful qualitative and quantitative fulfillment of the plans for filling up educational institutions unquestionably are laid down back in the stage of the young people's first acquaintanceship with the aviator's profession. The entire set of resources must be used in this matter such as is done; let's say, in the selection commission of the Kamchatka Production Association headed by deputy commander I. Tarasevich. Preparatory courses, clubs and circles of young aviators operate here the year around, with active help given them by Komsomol and trade union organizations.

Unfortunately, one has rare occasion to encounter similar concern for indoctrinating aviators' replacements, which is also confirmed by statements in your newspaper by the heads of clubs and schools of young aviators from Ukhta and Krasnoyarsk in the reports "The Club Awaits Sponsors" and "Just Who Will Come Tomorrow?" Without the support of the heads of air enterprises this work is doomed to extinction even with the most active participation of public worker enthusiasts. There are many examples of this. Just take the school of young aviators which was organized back in 1963 at the initiative of the Omsk Obkom of the Komsomol. During the 16 years of its existence it prepared some 1,000 graduates, of whom 580 linked their lives with Aeroflot. Thus the fact that it now has self-liquidated with the tacit consent of sponsors from the Omsk Flight-Technical School causes even more bewilderment and disappointment.

The importance of schools and clubs of young aviators in strengthening the contingent of pupils is rising under conditions of the sharp reduction in flow of graduating students. Now the sector has 138 clubs, schools, and small air academies in which more than 12,000 pupils are training. In 1984 three-fourths of the graduates of these associations entered civil aviation

educational institutions, but last year this number was sharply reduced. For example, the difference in the Komi Civil Aviation Administration was enormous: four persons instead of 117. Unfortunately there are no such clubs at all in the Moldavian, Georgian and Estonian administrations.

We can be provided with full-fledged replacements only by a set of measures aimed at drawing young people into our educational institutions. The experience of the Kiev Institute of Civil Aviation Engineers can rightly be called foremost in this respect. Last year, for example, Institute instructors and upper class students traveled to more than 100 cities, where they performed vocational orientation work in air enterprises and repair plants of civil aviation and in military units, including with military personnel to be released to the reserve, and with 11,000 pupils of schools of general education and PTU [vocational-technical schools]. The Abiturient staff headed by the Komsomol committee is constantly operating in the higher educational institution. To this should be added agitation flights and appearances by labor veterans and foremost production personnel on the radio, on television and in the press.

[Question] What must be done in the near future to activate the work of acceptance commissions?

[Answer] First of all, their work must be of a constant and not episodic nature. According to the existing strange "tradition," zonal commissions of higher educational institutions would begin their work only in May and neither the commission chairman nor the administration chief would bear responsibility for the results, although Ministry of Civil Aviation guidance documents provide for "placing personal responsibility directly on the chiefs of civil aviation administrations for fulfilling the plan for filling up educational institutions in acceptance zones."

The working youth and military personnel released to the reserve must be readied for entry in preparatory courses. It is no secret that many feel uncertain in exams without a renewal of knowledge. Maximum use must be made of the possibilities of taking entrance exams at the place of residence of graduating students. The practice of sending leaders of production as scholarship students directly from enterprises, repair plants, and construction-installation administrations of the sector requires development.

Open houses in the ATB [air maintenance facilities], services and shifts of air enterprises must be conducted more widely, during which young people will be able to become familiar with the nature of their future profession. It is a very bad situation locally with printed products advertising various educational institutions.

New means of agitation also should be adopted in parallel with the resolution of these problems--announcements for passengers over the public address system in air terminals and aboard the aircraft in flight. And finally, an effective means of attracting young people will be an improvement in everyday conditions, leisure time and quality of specialist training in the civil aviation schools and universities themselves. The high reputation of the educational institution is the surest guarantee of an increase in the number of those wishing to enter it.

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## CIVIL AVIATION

### AEROFLOT PLANS ICAO-STANDARD ATC IMPROVEMENTS

Moscow VOZDUSHNYY TRANSPORT in Russian 17 May 86 p 2

[Article by V. Shelkovnikov, chief of Central Air Traffic Administration of Civil Aviation, under "ICAO" rubric: "Reliable Air Traffic Control"]

[Text] "The party is promoting a cardinal acceleration of S&T progress and broad introduction of new generations of equipment and fundamentally new technologies providing highest productivity and effectiveness as the principal factor of an intensification of the national economy," notes the 27th CPSU Congress Resolution on the CPSU Central Committee Political Report.

Constant work is being done in the civil air traffic service to introduce the achievements of science and technology: air traffic control automation systems and secondary radar equipment complexes are being installed, consoles with a rather good ergonomic level are coming to air traffic control agency workstations, and the air space structure is improving.

One of the basic directions in the traffic service's work to accelerate S&T progress and apply progressive work technology is the planned introduction of International Civil Aviation Organization (ICAO) standards and recommendations to national air traffic control practice, and use of the experience of our friends from CEMA member countries.

In 1985 plans for recurrent flights were adopted on international air routes in accordance with recommendations of Annex 11 to the Convention on the International Civil Aviation Organization. This reduced the workload on aircraft crews in the preflight preparation stage, decreased the load on electric communication channels, and increased productivity of the air traffic control automation systems because the need disappeared to file flight plans for scheduled aircraft flights. Plans for recurrent flights were a good information basis for planning flights in the zonal center of the unified air traffic control system. In the near future these plans also will be introduced on intra-Union lines, which will eliminate flight plan filing for scheduled aircraft flights and is very important for air traffic control automation systems.

As a continuation of the work which began for adopting ICAO standards and recommendations, Sheremetyevo Airport adopted an automatic flight information

service for aircraft crews of the ATIS [Automated Terminal Information Service] and VOLMET [Meteorological Information for Aircraft in Flight] type in April of this year. The need for their introduction is obvious. There is an overload on the "crew-air traffic control agency" radio communications channel with the high intensity of flights in air zones of the country's main centers as well as in the vicinity of a number of airfields, which hampers air traffic control to a significant extent. Instead of solving one of the main problems--preventing violations of safe intervals for separation between aircraft--air traffic control agencies spend considerable time transmitting static flight information. This problem can be resolved by introducing automatic radio broadcasting information in the vicinity of airfields (ATIS), which has been adopted in international practice and is being successfully used in a number of countries.

ATIS initially is undergoing an experimental check at Sheremetyevo International Airport, and then it will be adopted at international and intra-Union airports which have a heavy volume of air movements.

Just what is ATIS? The ATIS radio broadcast announcements, intended both for arriving and departing aircraft, include information on the kind of planned landing approach or take-off pattern, flying field condition, runway surface features, airfield weather conditions and other important operational information. The need for a large number of repetitive announcements coming from various air traffic control points thus disappears. At the same time, the crew can obtain necessary information at any moment without querying the controller by switching to the appropriate ATIS channel. The freed-up time will permit both the controller and the crew to perform their primary tasks more efficiently--making decisions and analyzing the air situation, especially when special incidents arise in flight and in trouble situations. Automatic transmission of ATIS information at international airports will be in both Russian and English.

VOLMET meteorological information on a high-frequency radio broadcasting channel is being introduced simultaneously with ATIS at civil aviation airports. Its essence is the constant automatic announcement of forecasts and actual weather at nine (by ICAO standard) airfields which are alternates for the given air traffic control regional center.

Aircraft crews' rapid and prompt receipt of necessary information makes it possible for the crew to make a correct, rapid decision in the choice of an alternate airfield. This will also lead to a drop in workload on the "crew-air traffic control agency" coordination channel, which is especially important in periods of "trouble situations" and when destination airports are closed.

VOLMET information arriving at the workstations of air traffic control regional centers will contribute to a more correct choice of an alternate airfield. Initially the VOLMET flight information service is being introduced in Russian and English in a number of air traffic control regional centers serving international air routes.

The "time window allocation" procedure (the so-called SLAP procedure), has been used successfully in recent years in coordination of the Main Center of the Yes UVD [Unified Air Traffic Control System] with European centers for planning aircraft flows. SLAP is especially effective under the restrictions introduced by the air traffic control agencies of a number of foreign states on throughput capacity of air transport in periods of maximum traffic intensity. Adoption of this procedure permitted aircraft crews making flights to European airports (or making a transit across Europe) to receive a "time window" or designated time of passing the corresponding intensive point of intersection of air routes before a takeoff. Such permission guarantees the crew that the aircraft will not be delayed on the flight route even in a period of intensive traffic. This also will lead to a saving on aviation fuel.

The SLAP procedure adopted at a special ICAO European Aeronavigation Conference in Paris in 1980 is sufficiently universal and is being used both in automated and nonautomated centers for planning aircraft flows. It has been introduced in air traffic control agencies of the majority of European countries, including in all CEMA member countries. Introduction of this procedure in the Main and zonal centers of the unified air traffic control system in support of the planning of aircraft flows to preclude an overloading of air traffic control agencies is planned for this year.

Radio traffic phraseology developed in strict conformity with recommendations of the "ICAO Radiotelephone Communications Manual" and with consideration of national flight control rules will be published in the near future. In addition to customary phraseology of radio traffic between aircraft crews and air traffic control agencies, it covers radio traffic between air traffic control agencies and transportation resources, and among interworking air traffic control agencies, including centers for planning aircraft flows. Adoption of such phraseology unquestionably will promote an increase in technological discipline, a reduction in the load on the controller staff, and cleanliness of the air waves.

The Central Air Traffic Administration jointly with NETs AUVD [Scientific-Experimental Center of Air Traffic Control Automation], ULS MGA [Flight Service Administration of the Ministry of Civil Aviation], TsUMVSA [Central International Air Services Administration] and MTs AUVD [Moscow Air Traffic Control Center] presently is conducting preparatory work to introduce standard aircraft departure and arrival paths of the SID [Standard Instrument Departure] and STAR [Standard Instrument Arrival] type to national practice as recommended by the "ICAO Rules for Flights and Air Traffic Services" and which provide for the "continuous" [besstupenchatyy] climb and descent of aircraft at optimal flight regimes.

It can be said with assurance that use of ICAO standards and recommendations in the work practice of traffic service agencies promotes accomplishment of the task of improving the safety, regularity and economy of flights.

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CIVIL AVIATION

IL-86 SERVICE TO NORILSK BEGINS

Moscow VOZDUSHNYY TRANSPORT in Russian 22 May 86 p 1

[Article by VOZDUSHNYY TRANSPORT correspondent Yu. Dmitriyev: "Destination Airport: Norilsk"]

[Text] The wide-body Il-86 began regular flights to one of the largest cities of the Arctic.

When Il-86 flights were just beginning, the automated ticket sales and reservations system could not yet store all 350 passenger seats in memory: it would issue them as if adding two Tu-154's. Today, six years later, the Sirena-2 has "become accustomed" to the multiplace aircraft. But when specialists of the Main Civil Aviation Computer Center called up on the automated system's display screen at my request the number of tickets sold prior to the first regular flight to Norilsk, it proved to be small--only 84.

We phoned Norilsk and were informed that 350 tickets had been sold for the return flight to Moscow.

Residents of Norilsk and Taymyr have waited long for this day. There was always a high demand for flights to Moscow here at the beginning of summer, just as there were for flights from the capital in the fall. The runway was lengthened and reinforced, two wide taxiways were laid, and fixed fuelling points and power sources were installed to receive the wide-body aircraft.

"The Norilsk residents prepared rather well for receiving the new aircraft," said G. Smorzhok, commander of the subunit of Il-86's of the Vnukovo Production Association. "And we in turn prepared the crews. All pilots have great experience in flying the skies above the northern latitudes. A technical flight was made to Norilsk in early January. In late April we landed in Khatanga to check the readiness of this airfield as an alternate. And today will be the first regular flight in a few hours."

The crew headed by G. Larkin, who was decorated with the "Emblem of Honor" Order for mastering the Il-86, received the honor of making the first flight, 2247. In order to raise the level of payload utilization in the direction which now has a low passenger demand--to the Arctic--the flight incidentally carried 10 tons of dietetic eggs and three tons of mail to Norilsk. There was understandably no problem with the return load, which was at 100 percent.

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CSO: 1829/211

## CIVIL AVIATION

### LASER APPLICATIONS IN AIRCRAFT REPAIR

Moscow GRAZHDANSKAYA AVIATSIYA in Russian No 3, Mar 86 pp 40-41

[Article by A. Labazin, L. Alminovich and I. Logvinov, associates of Irkutsk Branch of KII GA [Kiev Institute of Civil Aviation Engineers]: "Lasers in Aircraft Repair"]

[Text] The laser technology being widely introduced in all sectors of the national economy also should play an important role in aircraft repair production. Laser emission has a unique property: it is simultaneously a heat source and a bearer of information. Its thermal effect on materials permits carrying out three kinds of processing on the same type of equipment. The first includes processes involving removal of destruction products from the beam's effect zone: drilling, cutting, balancing of rotating parts, cleaning of surfaces. The second type is the connection of parts and welding. Also included here is the application (surfacing) of additional layers on the surface of materials. The third type includes processes of a change in structure of surface layers: hardening, alloying, removing residual stresses. The property of laser emission as a bearer of information also may find application in measuring and monitoring systems.

Monopulse and multipulse hole drilling was one of the first laser operations mastered by industry. In multipulse drilling the pulse repetition frequency reaches tens of hertz with a duration of several hundred microseconds. Solid-state Neodymium-glass and YAG lasers are used most often here. Their pulse energy reaches several tens of joules. Gas lasers with a single pulse of increased duration (up to 100 milliseconds) and output power of up to 500 watts, or with short pulses (from 10 to 100 microseconds) with a repetition frequency of up to 100 Hz and an output of several kilowatts also are used for drilling.

The size of holes drilled depends on the material and laser parameters. Aluminum-yttrium lasers permit obtaining holes of up to 0.2 mm diameter, neodymium lasers up to 0.8 mm, and carbon dioxide lasers with pulses of increased duration using rotating optics, up to 15 mm.

Laser drilling can be used in aircraft repair production to make holes for pins, rivets and screws. Laser removal of rivets also is possible.

In comparison with mechanical or gas-plasma cutting, laser cutting has a number of advantages: large productivity, ease of obtaining complicated shapes, good quality of the edge, small thermal effect zone, an absence of mechanical damages and deformations, and the possibility of automating the process relatively simply. CW gas lasers are presently being used for cutting; they have the highest efficiency (up to 20 percent) of series-produced industrial lasers.

To increase productivity, oxygen or inert gas is supplied to the cutting zone. The gases remove combustion products and intensively cool the material. Oxygen sustains the material's combustion, while inert gases, to the contrary, suppress it. Therefore oxygen is used most often in cutting metals, especially in thick sheets. Its use provides for an increase in cutting speed, which reaches 1-8 m/min with a sheet thickness of 0.5-3 mm. The width of the slit being cut can vary from 0.2 to 1.5 mm. Cutting in an inert gas medium provides a narrow slit and an edge with almost parallel walls. This method is used most often for cutting nonmetals. The average cutting speed can reach 10 m/min with material thickness of 0.5-10 mm. It should be noted in particular that laser emission cutting of fiberglass prevents crumbling of the edges.

In repairing aircraft and aircraft engines, laser emission can be used to cut and lay out [raskraivat] pipes and sections into measured blanks [mernaya zagotovka]; durite hoses for connections; sheet metal in making irregularly shaped plates of reinforcing elements; and various dielectric materials in repairing cockpit and lounge windows and flight equipment.

Many articles which rotate at high speed are used in aircraft equipment: parts of compressors, turbines, fans and pumps, propellers and much more. All of them are subjected to dynamic balancing at various stages of repair. This operation can be done automatically using laser pulse emission. It is based on removal of unbalanced masses with a laser beam. The laser method permits a considerable increase in productivity of the process and a substantial expansion in industrial capabilities; it unquestionably will find wide application in aircraft repair production.

The labor-intensiveness of removing paint and varnish coatings can reach substantial proportions in preparing for repair. In addition, removal methods are not universal, they often are harmful to people's health, and they are a fire hazard. Industrial processes are extremely poorly subject not only to automation, but even to mechanization. The laser beam stands out very favorably as a tool here as well. It does not damage the underlying material and essentially is free of all deficiencies inherent to traditional means of affecting the surface.

Experience shows that it is advisable to use continuous gas lasers for these purposes. The requisite power density here is much less, for example, than for cutting metals. With a laser output of one kw, cleaning productivity can reach 10-12 square meters per hour. The use of pulsed lasers is permissible with small areas to be cleaned.

Research performed in the Chair of Flying Craft of the Irkutsk Branch of KIIGA established the unquestionable promise of the laser method of removing paint and varnish surfaces, compounds, and sealers [germetiki]. Its practical use depends on the creation of devices capable of maintaining, in an automatic mode, a constant distance between focussing optics and the surface to be cleaned, and to provide for sequential scanning of the surface. The devices obviously also must contain adjusting elements which alter the cleaning mode depending on the thickness and thermal properties of surfaces.

Laser welding has been widely tested and has given a good account of itself. Joints obtained with its help are high-strength and meet demands placed on aircraft parts. The weld structure in laser welding is more even and more finely divided than in other methods. This has a positive effect on corrosion resistance and fatigue strength of welded joints. The high energy concentration in the laser beam permits reducing weld width and consequently the thermal effect zone, which also has a favorable effect on quality.

Welding by the continuous emission of a gas laser is distinguished by high productivity. It is done at a speed of up to 150 m/hr, which is an order of magnitude greater than with argon-arc welding. Laser welding also can compete with electric-beam welding, since the presence of vacuum chambers is not required.

Welding also can be done using pulsed lasers. If a continuous weld is required there must be some overlap of the welding zones obtained in the effect time of each pulse. Solid-state and gas lasers are used for this kind of welding. The pulse duration of solid-state lasers with an energy of up to 50 joule reaches 10 milliseconds, and that of gas lasers with an average output of up to 100 watts reaches 1,000 microseconds. The pulse repetition frequency is from 1 to 100 Hz. As a rule, the diameters of welded spots do not exceed 0.6 mm and the depth does not exceed 500 micrometers. Laser spot welding permits reliable connection of different materials and electric wires and can be used very effectively in repairing radio and electrical equipment.

Laser surfacing of materials in repair production also is promising. Of special interest is the surfacing of self-fluxing powders which form uniform coatings of high hardness and corrosion resistance on the surface of parts. Laser surfacing permits restoring parts whose repair previously was considered impossible and significantly reducing the cost of their restoration. The service life of parts restored by laser surfacing of powder materials is not inferior to that of new parts.

Laser strengthening of metals and alloys, a new direction in heat treatment, should be considered one of the most promising ones for aircraft repair production. Strengthening is achieved by very high rates of heating and cooling of a thin surface layer. Three varieties of strengthening are distinguished depending on the treatment mode: without a phase transition, with a phase transition (fusion), and glazing (forming an amorphous layer).

The operating characteristics in separate sectors of the surface can be altered by laser alloying. The necessary alloying element is supplied to the laser effect zone for this purpose. One of the problems in introducing the

alloying method is to develop an effective method of preliminary application of the alloying element. Electromachining can be used for this. A combination of the electric-spark method of applying a layer and subsequent laser irradiation reduces the roughness of the processed surface, increases the depth of alloying and increases the uniformity of the material in the alloying zone.

The promising nature of introducing laser strengthening and alloying is obvious. With the acute shortage of costly alloy steels, these processes permit using ordinary structural steels to make strong and reliable articles or to restore the operating characteristics of parts being repaired.

A large group of industrial processes in aircraft repair production, as in industry in general, is connected with measurements. Laser emission permits obtaining data with high accuracy reaching tenths of a percent in monitoring the size and shape of parts as well as their displacements, in measuring the thickness of deposited films, in identifying surface defects, and in determining mechanical properties and roughness of materials.

The introduction of scanning laser units to aircraft repair production for flaw detection of transparent and nontransparent materials is the most likely. The capabilities of these units are such that materials undergoing flaw-detection can move at a speed of up to 1,600 m/min, during which cracks, scratches, chips, foreign inclusions and other defects less than 0.01 mm in size are detected.

Successful introduction of progressive laser technology unquestionably depends on the creation of industrial units equipped with automatic mode control systems. Process automation is possible in particular by use of industrial robots having adaptation features, i.e., the "skill" to compensate for deviations from calculated modes.

The possibility of performing the majority of operations on equipment of the same type will allow creation of specialized production sectors or even shops, which beyond all doubt will have a positive effect on the efficiency and quality of aircraft equipment repair.

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CIVIL AVIATION

SCIENTIST URGES MORE ADVANCED COCKPIT INSTRUMENTATION

Moscow GRAZHDANSKAYA AVIATSIYA in Russian No 3, Mar 86 pp 40-41

[Article by B. Vasilevskiy, scientific associate of NETs AUVD [Scientific-Experimental Center of Air Traffic Control Automation], candidate of technical sciences: "Onboard Digital Devices"]

[Text] Our era is marked by the rapid development of electronics. The component base has changed repeatedly in the memory of a single generation of people: cumbersome tube equipment of wartime years with limited functional capabilities was successively replaced by transistorized articles and then by devices based on integrated microcircuits. There was a corresponding increase in the range of tasks, complexity and composition of flight electronics of civil aviation aircraft. Suffice it to say that today it represents 40 percent of the cost of the entire aircraft.

But the demands on functional capabilities of todays aircraft continue to increase steadily. There must be a further reduction of the weather minimum, an increase in regularity of flights, a narrowing of "corridors" and so on. These demands cannot be supported without a concomitant expansion in functional capabilities of electronic equipment. The economic nature of its operation (including maintenance and repair) must improve in parallel. Finally, it is also impossible to ignore the resolution of ergonomic problems and making it easier to control and monitor the serviceability of the aircraft and its equipment. Of course, the need for accuracy of operation, dependability of equipment and a reduction in its weight and energy consumption is hardly removed from the agenda with all this.

Fundamentally new solutions, use of the most up to date component base, increased complexity of design and layout of gear, and special measures preventing a possible drop in reliability are necessary to satisfy such a set of varied requirements. In addition, the requirement for an increase in economy of operation causes difficulties both of an organizational and technical nature. The fact is that high qualifications and narrow specialization of attendant personnel are needed for servicing the sophisticated modern devices. This means an increase in economy of maintenance and repair can be achieved first of all by developing fundamentally new devices requiring a minimal amount of labor inputs for servicing with minimal qualifications of attendant personnel; and secondly, by

rational organization of servicing in which only that work is performed, the necessity for which is dictated by the technical condition (servicing "by condition").

The resolution of ergonomic problems for the aircraft also has assumed exceptional importance. The presence of a large amount of varied onboard gear with a multitude of various controls and indicators complicated the piloting process. It is more and more difficult for the pilot to orient himself in this mass of instruments, scales and switches. And when a difficult situation arises in flight, when fast, faultless decisions must be made, the large volume of "superfluous" (at the given moment) information increases the risk of error.

Use of discrete (digital) technology permits overcoming the majority of these difficulties to a considerable extent. Among the advantages of digital processing of signals to be analyzed is the absence of a need for tuning regimes and consequently a reduction in the number of controls; a reduction in the effect of instability of certain equipment parameters on its working capacity; and the greater interchangeability of units, assemblies and components.

Digital equipment is more efficient both from the standpoint of its manufacture and in its servicing and repair. Its use facilitates the task of creating ramified systems for monitoring the working capacity of electronic devices. It is not surprising that digital equipment is deemed promising for use in onboard devices for automation of piloting, navigation, communications and so on. Its use is constantly expanding.

We will tell in more detail about ways to improve the effectiveness of maintenance of digital devices. The basis of such maintenance is maintaining the working capacity of the gear. This is facilitated to a considerable extent by automation of the process of monitoring the working capacity by solving a "test" problem. To this end the built-in generator is used to produce a monitor signal, which is passed through the monitored circuit. The presence of a signal with prescribed parameters at its output indicates normal operation. This principle of monitoring permits timely identification of an unserviceable unit or assembly with low labor inputs.

After the faulty device has been identified, its working capacity must be restored, for which the disabled element must be located and replaced. At times the search requires considerable labor inputs and high skills of servicing personnel. There is a more promising method of restoring working capacity by identifying the location of the malfunction (using built-in monitoring devices) with a precision not to an individual element, but to a functional complete assembly (board), and replacing the given assembly. The faulty assembly (board) must be restored in specialized enterprises such as at the manufacturing plants. Particular attention must be given to the ease of removal and interchangeability of all basic functional assemblies and boards in developing new radio gear in order to introduce such a method of restoration. Use of digital equipment facilitates accomplishment of this task.

The following maintenance scheme seems ideal:

- Flight maintenance until failure of one of the units identified by built-in monitoring equipment;
- Replacement of faulty unit aboard the aircraft;
- Restoration of unit's working capacity in air maintenance facility laboratory by replacement of faulty assembly (board);
- Dispatch of faulty assembly (board) to a specialized enterprise.

Adoption of this scheme will permit a substantial reduction in labor input for maintenance and a decrease in the demand for the attendant personnel's skills. As a result the effectiveness and economy of maintenance will be sharply increased.

The succession of generations of electronic articles is of great importance for economy. Each replacement of obsolete equipment for more improved equipment makes it necessary to lay a new cable system, replace mounting racks and develop new layout drawings. At the same time, use of standardized digital units will allow modernization of a system gradually by replacing individual units for more improved ones.

And one other problem can be successfully resolved in the transition to the discrete principle of signal processing: elimination of the flow of "superfluous" information. A rational display of the data needed for the pilot's operation can be achieved by using centralized indicators (displays) where the information is sent to their screens from an onboard digital computer. Such indicators will permit complete alteration of instrument panels of pilot cockpits and removal of a large number of various indicators. In the final account this will make it easier to control the aircraft and will increase flight safety.

The trends noted in development of onboard electronic equipment allow one to expect qualitative advancements in aircraft designs in the near future, which will affect both the conditions of flight and technical maintenance and the capabilities of using civil aviation aircraft.

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CSO: 1829/214

CIVIL AVIATION

ROBOTS URGED FOR ASTRA ENGINE TESTING SYSTEM

Moscow VOZDUSHNYY TRANSPORT in Russian 17 Apr 86 p 2

[Article by Yu. Kiselogof, chief of IVTs [Computer Information Center] of Civil Aviation Plant No 404, Sverdlovsk, under "VOZDUSHNYY TRANSPORT Questionnaire: My Participation in Acceleration" rubric: "Microrobots Await Work"]

[Text] It stands to reason that a radical, decisive reorientation of the national economic mechanism toward an intensive development path is impossible without broad introduction of the achievements of S&T progress to our day to day practice. Nevertheless, success is determined here not by the machine, but by man!

It would appear that with the computerization of production electronics and automation will take on all the most painstaking and responsible work. Sit down at a console and press buttons, oblivious to all else. This is a naive and harmful delusion. The introduction of computer technology to industrial processes not only does not reduce the role of the worker and specialist; it sharply increases that role.

Finding one's place in this complicated, many-sided process is in itself no simple matter. Both our indecisiveness and sluggishness are felt here at times. We don't always have the courage to admit that we won't get very far with existing equipment and operating technology (even if we use available reserves).

It is especially difficult to make up our minds to revise customary and outmoded views and obsolete traditions. This is particularly so if the collective which carries these traditions was among the leaders for many years in a row and was set as the example for all at the plant. It is very important to understand in time that what was really good yesterday is no longer satisfactory by today's yardstick. Time demands that we go further and achieve more.

To their credit, that is just how the collective of deservedly foremost Shop No 4 (or in other words, the engine testing station (MIS)), which has been headed by V. Pitirimov for long while, understood the reorientation which began.

After weighing the specialists' proposal to automate the helicopter engine testing process using computers, the engine testing station decided to try its hand in this new matter. It stands to reason that everything did not go right all at once, but in the process of creating the Astra plant technical management automation system (ASUTP) a creative collective formed and strengthened in which each person found his place. For example, process engineer Yu. Lonashenko and production foreman V. Morozov established a task for plant computer information center programmers V. Kokunin and I. Teterina based on an analysis of the old "manual" industrial process. Computer center electronic specialists [elektronshchiki] V. Dmitriyev and V. Tutynin together with shop instrument specialists M. Shabanov, V. Akinevich and V. Rybnikov laid kilometers of cable communications lines between engine testing station benches and the computers. Shop fitters and test mechanics began renovating the benches. It is not difficult to imagine what it means to modernize industrial equipment "on the move" without stopping it, especially such an industrial complex as the test bench: it is work bordering on selflessness. Innovation enthusiasts V. Korolev, V. Chulochnikov and their comrades had to display much ability, resourcefulness and experience before the test bench received the right to a new and as yet uncommon name--automated industrial complex [tekhnologicheskiy kompleks].

Although much already has been done in the area of retooling, there are even more tasks and problems ahead. They appeared as the automation system was created. Shop and computer information center specialists together with associates of the Sverdlovsk PKB ASU [planning and design bureau management automation system], the TsNII ASU GA [Central Scientific Research Institute of Management Automation Systems of Civil Aviation], and RKIIGA [Riga Red Banner Institute of Civil Aviation Engineers] are working to further develop the Astra and expand its functions and capabilities. Some things require additional finishing and necessary changes. This is understandable as it is the first time a system such as the Astra ASUTP has been created and introduced, so people had to learn chiefly from their own mistakes.

The lively participation and support of plant leaders played an appreciable role in successes of the shop's retooling, and the new staff of the plant party buro, which has a good understanding of the role of acceleration of S&T progress in improving the effectiveness of aircraft repair production, gives these matters increased attention. It was no accident that at Secretary Yu. Anfimov's suggestion, the first working session of the plant party buro held a special hearing on the progress of automated testing of aircraft engines and reducers.

The elevated businesslike mood with which we in the collective solve problems of raising the quality of repair based on an introduction of S&T achievements, including computer technology, cannot help but infect even those who at first regarded automation very cautiously from a position of "What if nothing happens?" Credit for the fact that fewer and fewer skeptics remain from day to day goes to those first people who disavowed the relatively quiet life, realizing that this was a shaky state.

But here is the thought which gives no peace. It is not just the workers of one plant who must find their place in solving the problem of comprehensive

aircraft repair production automation. Those who in their official duties determine the technical policy of plants of the entire Aviaremont Association also are obligated to find it.

In designing the Astra ASUTP and testing the helicopter TVD [high pressure turbine], we decided to create a remote control system which would allow adjusting main engine parameters on computer command directly to the power setting [rezhim] without wasting time for stops. Microrobots installed right on the engine units were created for this purpose (and even defended at the level of inventions). The small size and consequently light weight, precision in positioning and other characteristics were assessed on their merits by the testers who had to carry out their experimental operation as part of the ASUTP. Only a small number of these unique mechanisms were made under laboratory conditions, however, although the fact is that many tens or even hundreds of them are needed for industrial use both in the plant engine testing station and in the machine [agregatnyy] shop, where they can be used successfully for self-contained tests of hardware.

It would appear that matters simply should inevitably shift from a standstill, but far from it! Although development and testing of the microrobots ended in 1983 and was approved by Ye. Bolshakov, chief of the department of automation equipment and production development of the Aviaremont VGPO [All-Union State Production Association] (and, moreover, by Association Chief Ye. Kitov), their production has not been organized to this day at a single one of the civil aviation experimental plants. The fact is that use of these servo mechanisms can significantly raise labor productivity in testing engines and machine units at many aircraft repair enterprises.

It is a pity that specialists of other sectors are coming to us requesting use of the microrobots while enterprises of our own sector are not showing any interest. I will note that moral support alone on the part of the Association's leaders is not enough; specific help is needed. I would like to believe that series production of these robot engineering mechanisms will be organized in the final account within the framework of the Association, which has many plants including those making nonstandard equipment.

Difficult S&T problems connected with comprehensive production automation cannot be solved by direct administration or a stern order. Systems such as the Astra are viable only when on-site people "below", directly in production, are firmly convinced of their advisability. Experience shows that production personnel have such confidence and the conviction that the automated system is necessary and will function reliably and advantageously. It has been proven by concrete action.

Now only the precise, coordinated actions of all subunits working on this problem, from the shop brigade to the all-union association, are needed.

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CSO: 1829/206

## CIVIL AVIATION

### CHIEF ON AVIATION FUEL SHORTAGES, FUEL CONSERVATION

Moscow VOZDUSHNYY TRANSPORT in Russian 8 Apr 86 p 2

[Article by I. Shishkov, chief of GSM [Fuels and Lubricants] Administration of MGA [Ministry of Civil Aviation], under "Take Care of the People's Property" rubric: "Use Funds Completely"]

[Text] "We haven't been able to take off for the second day now. . . . The airport pleads interruptions in fuel delivery"--such telephone calls from passengers as well as collective letters to the editors from them on this subject are no rarity.

Also no rarity unfortunately are the seemingly well-reasoned complaints from civil aviation specialists where late fuel delivery is advanced as the only reason for irregularities and other disorders in the work of airports.

Is this so? Aren't their authors shifting the blame to someone else, as the saying goes, perhaps out of ignorance?

Ministry of Civil Aviation Fuels and Lubricants Administration Chief I. Shishkov provides explanations.

The Basic Directions for National Economic and Social Development pose no simple task: an increase in the national economy's needs for fuel, energy and other materials must be satisfied through purposeful work of economizing on them. This relates to civil aviation, the largest consumer of aviation fuels, to a special extent. The rhythmic nature of work by aviation enterprises depends more and more each year on their timely supply of fuel, its rational and thrifty use, and strict accounting for consumption. Allocated fuel funds permit assuring the fulfillment of production plans for satisfying the national economy with air movements on condition of their full use and mandatory fulfillment of established economy quotas. Success of the matter especially depends on fulfilling these conditions during the most intensive summer period, when the time for maximum fuel consumption arrives in all the country's airports and at the same time the tanker fleet is carrying practically the entire year's supply of aviation fuels and lubricants to Far North areas. Meanwhile, fuel production by industry plants remains level.

The supply of fuel to airports for the summer period must begin to be assured with the first days of the year through thrifty use of each ton of fuel and accumulation of production reserves during January-May, when funds considerably exceed the needs of enterprises.

An analysis of the sector's work in the 11th Five-Year Plan and in 1985 shows that not all civil aviation administrations regard the accomplishment of these tasks with a proper sense of responsibility.

Work to implement supply plans usually begins in a number of enterprises only after complete expenditure of production reserves of fuel and often reduces to requests to the ministry for help or for assigning another supplier. Many reasons can be found for explaining the underdeliveries, but North Caucasus airports were short more than 80,000 tons of aviation kerosene under supply plans in the first half of 1985, the Volga UGA [Civil Aviation Administration] was short some 45,000 tons, and the West Siberian Civil Aviation Administration was short over 40,000 tons just because of the absence of business contacts with suppliers, oil refineries and the railroad.

As a result, the planned accumulation of reserves to cover the scarcity of resources for the summer period did not occur, and a strained situation with the supply of fuel to flights had developed in a number of airports already in June.

Funds for aviation fuels and lubricants allocated to the sector permit meeting production plans on condition of strict compliance with expenditure limits and fulfillment of established economy quotas.

Civil aviation enterprises have accumulated enormous experience in locating additional reserves. In 1985 alone the sector provided for a direct and relative saving of hundreds of thousands of tons of aviation kerosene.

The Arkhangelsk, Far East, Komi, Urals and other civil aviation administrations assured the fulfillment of production plans with a saving in established limits of aviation fuel.

The 1985 results could have been higher, but unfortunately a number of enterprises did not take a properly responsible attitude toward the work of improving the efficiency of fuel expenditure; moreover, they allowed a considerable overexpenditure of aviation kerosene as compared with the established limits: the Moscow Transport Administration by 27,500 tons, the Volga Civil Aviation Administration by 3,400 tons, the Tajik Civil Aviation Administration by 1,300 tons, along with a number of other civil aviation administrations. A large volume of fuel still is being consumed for engine operation on the ground, and last year it even increased in a number of enterprises. The norm for engine operation on the ground for the Il-86 was exceeded by 3.4 percent in the MTU [Moscow Transport Administration]; the Tyumen Civil Aviation Administration exceeded the norm for the Il-76 by 2.8 percent; engine operation on the ground in the Tajik Civil Aviation Administration was 3.6 percent above the norm for An-24 aircraft and 7.3 percent over for the Yak-40. Overexpenditures for some types of aircraft also occur in other administrations.

Unfortunately, a number of administrations do not give proper attention to the planning and accounting of fuel consumed for ground needs. There was an overexpenditure of aviation kerosene limits for technical needs in the ATB [air maintenance facilities] of 3,700 tons for 1985 for the sector as a whole. It would appear that the loss for the sector is not great, but an analysis shows that the accounting of fuel consumed for these purposes is not reliable in a number of enterprises. For example, judging from data submitted by the North Caucasus Civil Aviation Administration, the administration's air maintenance facility expended 1,600 tons of aviation kerosene and got a saving of 300 tons as compared with the limit, while at the same time, according to fuels and lubricants service accounting data, the air maintenance facility issued 4,300 tons, or 2,700 tons over the indicated expenditure.

The very same facts were present in the Georgian, Komi, Yakutsk and other civil aviation administrations.

In the Uzbek Civil Aviation Administration, to the contrary, the air maintenance facility expenditure was 1,600 tons, but the release of aviation kerosene from fuels and lubricants depots for technical needs was not shown at all in Form 36 GA, which means the fuel is being released without accounting or resources from aircraft tanks were used for maintenance without appropriate formalization.

The state of accounting for expenditure of fuel for operating engine heaters causes special concern. The hourly expenditure for each unit is only a few kilograms, but when we consider that thousands of them are operated in civil aviation, it is clear that the fuel volumes here are very significant. At the same time, it is apparent from materials submitted that many administrations are not properly planning fuel expenditure for heater operation or accounting for its use. A check of work of the Norilsk Aviation Enterprise showed that for 1985 alone 342 tons of aviation kerosene were used to operate engine heaters. Expenditure of this kerosene was not planned and there was no appropriate formalization of the write-off. In the corresponding report of the Krasnoyarsk Civil Aviation Administration, however, there is no mention of accounting for fuel for these purposes.

It is the very same situation in a number of other administrations. The main reason given in the incoming reports for overexpenditure in the air maintenance facility is a shortage of limits, while volumes of fuel consumed for operating engine heaters are shown approximately since they were not planned and accounting has not been properly organized.

The very same facts also exist in the expenditure of aviation fuels for hot air blowers despite strict limits. There was an overexpenditure of 16,200 tons for the sector as a whole for 1985, including 2,900 tons for the Ukrainian Civil Aviation Administration, 1,300 tons for the Volga Civil Aviation Administration and 1,000 tons for the North Caucasus Civil Aviation Administration. Substantiation of the reasons is the same--restricted limit and bad weather. But a characteristic detail is apparent: weather at Moscow airports for the most part does not differ sharply, but there was a saving of 500 tons on limits of aviation kerosene expenditure for hot air blowers in

TsUMVS [International Air Service Central Administration] for 1985, while the Moscow Transport Administration allowed an overexpenditure of 1,600 tons. The conclusion is clear: the key is to organize the work and not cover up with references to weather conditions.

The conservation of fuel resources is a task of primary importance for fuels and lubricants services as well, but in addition to the deficiencies noted earlier, there are losses in resources even at depots in a number of enterprises. The loss of 260 tons of aviation kerosene at the Ust-Kamchatsk airport due to a broken pipeline and the mixing of 200 tons of aviation kerosene and diesel fuel at the Varanday airport can be explained only by negligence and nonfulfillment of one's immediate duties. Such facts also exist in other enterprises as well.

In the final account all this leads to an above-plan expenditure of fuel resources in airports and, as a result, to disruptions in work and legitimate complaints from passengers. The crews' painstaking work to economize is almost completely lost because of additional landings for refueling, and for the sector as a whole fuel expended for such landings is not covered in any plans.

In the 12th Five Year Plan civil aviation is faced with the task of assuring a 3-5 percent drop in specific consumption of aviation fuel in fulfilling planning quotas. The fuel saving already has been considered in established limits of fuel consumption for fulfilling the 1986 production plan. Fulfillment of planning quotas depends wholly on effectiveness of the use of each kilogram of fuel and on the conservation of its resources.

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CSO: 1829/206

CIVIL AVIATION

CHIEF ON IMPROVING AEROPROYEKT DESIGN, DOCUMENTATION QUALITY

Moscow VOZDUSHNYY TRANSPORT in Russian 22 Apr 86 p 3

[Article by V. Ivanov, chief of Aeroproyekt GPIiNII GA [exact expansion unknown], doctor of technical sciences, under "Factors of Sectorial Science Effectiveness" rubric: "Latest Achievements into the Project"]

[Text] The process of acceleration of S&T progress in civil aviation is inconceivable today without a comprehensive activation of sectorial scientific research institutes and an increase in their contribution to the development of production. As shown in 27th CPSU Congress documents, we must find and use those factors which assure the leading role for those science establishments which persistently adopt everything new and foremost, carry on a creative exploration boldly and thoroughly, and do not rest on their laurels.

With the article published below, the newspaper is opening a new rubric: "Factors of Sectorial Science Effectiveness." The editors invite heads of research collectives, scientists, engineers and designers to express their opinions in the pages of VOZDUSHNYY TRANSPORT on fundamental problems of sectorial science and share their thoughts on ways to increase its contribution to the development of aviation production.

The "product" of our Institute is well known in the sector: new air terminals and runways, administrative facilities, and various kinds of ground equipment. We realize of course that much depends on the quality and completion deadlines of our developments. The designer's labor is somehow similar to that of the grain grower. The first sprouts can be seen not today or tomorrow, but in a few months. What they will be like depends on us and on the level of our designs.

Good results can be expected only by placing the latest achievements in the field of construction and mechanization into the design and fulfilling it at the highest level.

In just what way do we strive for and plan to strive for a rise in the S&T and technical-economic level of our developments? One of the principal directions in this important job is an improvement in the norms of industrial and construction designing.

Much is determined here by the completeness and quality of the normative base. At the present time our sector has a full set of norms for designing structures of airports, air terminals, airfields, freight complexes, air maintenance facilities and so on. Aeroprojekt completed a revision of normative documents for designing together with other scientific research institutes in the sector. For example, norms covering the creation of air passenger terminals provide an orientation toward fund-saving techniques of development, including expansion, renovation, and retooling of these structures (including using structures with a high degree of plant prefabrication which are rapidly erected using effective materials). The norms presume the adoption of new types of industrial equipment (electronic scales, equipment for container processing of baggage and so on). This will increase the mechanization level of passenger service processes from 53 percent in 1985 to 62 percent in 1990 with a simultaneous sharp rise in the comfort level. The mechanization level for freight service will increase from 46 percent in 1985 to 55 percent in 1990 because of the introduction of foremost freight processing technology in the airport freight complexes, adoption of mechanization, and wide use of the packet-container method of freight processing. Other tasks facing the collective include a reduction in cost and expenditure of physical resources, acceleration in the construction of buildings and structures, and an improvement in quality of technological and architectural-planning decisions. All this represents our plans for the near future, but we have to look back to what already has been done, analyze our work and yesterday's successes and failures, and take account of mistakes in order to fulfill the plans promptly and look boldly to tomorrow.

The important thing for us is not to miscalculate, because later (such as after completion of construction or creation of a new aircraft) it is very difficult to make corrections, which moreover lead to additional costs. Our achievements are the face of the medal so to speak. We also have mistakes and shortcomings, of course. They can be divided arbitrarily into two groups: those wholly on the conscience of the collective and those not dependent on us (for particular reasons).

I will dwell first on problems arising within the Institute. It is no secret that our specialists do not always put out high-quality planning estimates. For example, because of poor quality in performing the survey for construction of an air terminal complex in Baku it was necessary to partially revise technical documentation for foundations, which had a negative effect in building the project and created a certain amount of nervousness at the construction site. Unfortunately, such cases are not isolated ones.

The Institute places much emphasis on organizing the author's supervision, which is an effective factor in improving the quality of designs. For example, in 10 months of 1985 there were 1,168 trips to projects under construction such as, for example, Sheremetyevo Airport (construction of an

automated freight complex), the CEMA Civil Aviation Center, Sochi (runway lengthening), Kazan (air terminal construction), Baku (construction of an air terminal complex) and others.

Construction and installation work was suspended at a large number of sites as a result of the intervention of specialists exercising author's supervision: design solutions were not being followed in their construction.

But let's ask ourselves without being hypocritical: do our specialists always display proper principle and exactingness in carrying out author's supervision and acceptance of projects under construction? Alas, not always! I believe it is clear to everyone what such an indifferent policy of some of our workers, accustomed to look at the builders' mistakes through rose-colored glasses, leads to. It is now understandable why the runway at the Bukhara airport was out of service. The fact is that the designers knew that substandard sand was being laid in the sand-cement base of the airfield surface. Nevertheless, they kept silent and didn't stop the careless workers.

Or take another example: insufficient demands on the contractor to comply with construction technology led to a situation where Vnukovo Airport Runway 1 was placed in operation with defects.

We also are let down at times by shallow thought put into fundamental decisions in the initial stages of designing, which has a substantial effect on the end result of work. Here too we don't have to go far for examples, such as when the design of the Start building at Volgograd Airport was being developed: we had to make changes to it even after it was ready. Associates miscalculated by placing fans on the building's roof and only later thought to "hide" them in the basement. It all ended with our workers' labor wasted for nothing.

With regard to the scientific area, here too (as in the design area) some miscalculations are identical, as the saying goes. Again we see that same insufficient principle shown by scientists in the scientific accompaniment of the manufacture of equipment for mechanization and automation of production processes at airports and in acceptance of such equipment for operation, and insufficient depth of the plan. Let's take the SPDG, the self-propelled loader of long and heavy freight. Here our specialists clearly were too clever by half. They so complicated the design that manufacture of the machine needed by the sector became a tough nut for plant workers. This became one of the reasons for the delay in its production dates.

The trailer container-loader also cannot please the operators. It snaps the cable during movement and is "distinguished" by poor maneuverability. Had the scientists shown proper principle in placing necessary demands on the manufacturing plant in time, the deficiencies would have been remedied.

As I already said, there are also those deficiencies in our work which do not depend on us. The main one is that because of poor development of the construction industry we cannot always use foremost S&T achievements in designs. Often the most promising economic solutions and structures are not coordinated by the contract organization because it lacks a sufficiently

developed material-technical facility. And what is to be said about the lengthy periods of construction which exceed normative periods by 2-3 times? For example, construction of an aircraft repair building at Civil Aviation Plant No 400 has been going on for over 10 years! Not only have the structures changed in this time, but a new type of aircraft also has appeared.

An absence of stability of capital construction plans and design projects substantially affects the quality of documentation being drawn up. In order to prepare promptly for designing, conduct a quality survey and gather initial data our plans must be approved several months before the planning year. And it is also very important that plans for planning and surveying work be tied in with capital construction plans.

With respect to NIR [research] plans, they too must be approved before the beginning of the following year and must undergo as few changes as possible for the extent of their fulfillment. It happens where many additional assignments come to us during the year, often of a nonscientific content. For example, recently we were forced to calculate norms for expenditure of cable articles for repair and maintenance needs. Such norms already had been developed in TsUERTOS [Central Administration for Operation of Radio Technical Equipment and Communications in Civil Aviation], but we also performed a similar "operation" as a backup even though, I will note, no research for these purposes was required.

The Institute is very familiar with all the aforementioned miscalculations and deficiencies in the work. Just how do we combat them? With respect to intra-Institute affairs, to improve the associates' professional level we conduct technical training and quality days at which deficiencies and omissions are revealed and we take various measures of influence against the culprits. Contacts also have been arranged for the exchange of information with foremost higher educational institutions for construction and with design organizations. A comprehensive quality control system is in effect.

External problems naturally must be resolved at a higher level. We propose the following for fastest implementation of 27th CPSU Congress resolutions: grant greater independence to clients in determining projects to be built to the extent of allocated limits, and grant ministries the right to approve title lists for design and construction without coordination with Gosplan. The distribution of capital investments by sector with contract limits must be done 1.5 years before the beginning of a new five-year plan. Only then can future construction sites be provided with quality planning estimates. We also propose to change mutual contractor-client relationships by shifting to turnkey construction with all resultant transformations.

There must be an acceleration in bringing Aviastroy capacities up to the possibility of fulfilling construction and installation work to the extent of 70-80 percent of the Ministry of Civil Aviation's needs. After this, a scientific-production complex must be established on the basis of the UKS [Capital Construction Administration], Aeroprojekt and Aviastroy. Such unification will allow reducing the time periods for designing and building projects, improve their quality and assure fastest introduction of S&T achievements.

Elimination of our still existing deficiencies and prompt resolution of long-urgent problems will help the collective move to even higher goals both in designing new facilities and in creating new equipment.

## CIVIL AVIATION

### SUGGESTIONS FOR IMPROVING YAK-40 FUEL EFFICIENCY

Moscow VOZDUSHNYY TRANSPORT in Russian 24 May 86 p 2

[Article by I. Chekryzhov, Yak-40 commander, Belgorod, under "An Aircraft Commander's Word" rubric: "We Can Help the Researchers"]

[Text] I wish to dwell on certain points which provide for additional savings in operating the Yak-40. After beginning to fly it, I constantly asked the question of how to do this.

Our air enterprise has two aircraft with a pressure differential of 0.3 kg per square centimeter in the pressurized cabin. The RLE [exact expansion unknown] permits flights of such aircraft with passengers up to an altitude of 6,000 meters, and in high-mountain areas up to 7,200 meters. The difference in fuel expenditure turns out to be about 100 kg/hr.

If aircraft with this differential were allowed to fly up to an altitude of 7,200 meters everywhere, then our air enterprise alone would have provided 108 tons of fuel saved in 1985, i.e., 90 flying hours.

There is also that reserve for aircraft with a pressure differential of 0.4. They are allowed to fly to an altitude of 8,000 meters. What if an altitude of 8,100 meters were used? Again, this would give our enterprise an additional 90 tons of saving in a year.

And one other aspect of the problem. The Yak-40 airframe is 70-100 kg heavier after every repair. The aircraft payload decreases as a result. While the opportunity of choosing alternate airfields is favorable in the summer period, it is the opposite in the fall-winter period. This entails an increase in fuel load, which means a decrease in the payload. Moreover, in this period the passenger gets "heavier" up to 80 kg. We have an aircraft on which it is impossible to use all seats not only in winter, but even in summer: there will be an overload. And the other aircraft will be the very same when they undergo one more repair. This time is not far off.

After performing a brief analysis of the aircraft specifications, I believe it makes sense to increase its takeoff weight by 300 kg with an ambient temperature of over 15 degrees and by 600 kg with ambient temperature below 15 degrees. This will allow an average of a 25 percent increase in aircraft

productivity, for example, with a flight range of 600 km and 400 km distance from an alternate airfield. The problem of seats occupied practically disappears up to a distance of 1,000 km. It will be almost 100 percent.

Of course everything I propose must not have a negative effect on flight safety. I believe that rank and file pilots of production subunits can be of great help in resolving such problems, for who if not they have a superb knowledge of all the strong and weak points of the aircraft which they fly? They know its capabilities and reserves. What happens is that the GosNII GA [State Scientific Research Institute of Civil Aviation] sends a paper with instructions to write one's suggestions or answer questions, and that's it. I would like to see at least one person from there and have a talk with him!

It would be well if State Scientific Research Institute of Civil Aviation specialists periodically assembled in each administration the pilots of those types of aircraft which are operated there. Much benefit is seen in a joint discussion of urgent problems. Representatives of the ULS MGA [Ministry of Civil Aviation Flight Service Administration] also can do this.

Pilots wishing to engage in research under production conditions also can be used to help the State Scientific Research Institute of Civil Aviation and the Flight Service Administration solve various problems. This will both speed up the solution to many problems and will improve their quality.

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CSO: 1829/226

## CIVIL AVIATION

### CONSTRUCTION PROJECT DESIGNS, COSTS, QUALITY QUESTIONED

Moscow VOZDUSHNYY TRANSPORT in Russian 23 May 86 p 2

[Article by A. Churkin,, chief of Examination of Designs and Estimates Department of MGA [Ministry of Civil Aviation], under "Reorientation Practice: Capital Construction" rubric: "Guarding Design Quality"]

[Text] Serious criticism was heard at the 27th CPSU Congress addressed to design organizations. It was noted that the renovation and construction of some projects was being done under designs many years old which did not meet today's requirements both in design and technological solutions and in the level of equipment. The fact is that a novelty of investment policy in the 12th Five-Year Plan is its orientation on acceleration of S&T progress and qualitative transformations of the physical facility and production structure. This depends to a considerable extent on a cardinal improvement of designing in construction.

Last year specific measures were worked out for broad use of progressive technologies, equipment, materials and structures in designs. There was a revision in the list of effective standard designs, with the elimination from the list of those no longer corresponding to modern S&T achievements. And finally the work of revising 35 designs of above-limit construction sites having a production purpose being transferred to the 12th Five-Year Plan was completed in 1985. The work was done to ensure a high technical level of projects being built and for bringing the designed equipment of technological and construction solutions into line with present requirements.

Just what did the analysis show? To begin with, I will cite a few figures. Forty-one of the 54 designs examined by the ministry's expert review received approval and were recommended for approval practically without any substantial comments. Eight designs were reconsidered by the Examination of Designs and Estimates Department (OEPS) of Ministry of Civil Aviation after corrections were made within established deadlines and approved by ministry management. Designs for construction of a hangar building at Tallin Airport, for an air terminal in Barnaul, for a residence in Yakutsk, for a hangar building of Plant No 403 of Civil Aviation, and for a hangar at Pulkovo Airport were returned by the expert review for revision.

Ten of the 14 standard designs considered by the expert review received approval with the first submission and were recommended for approval. Four received an evaluation of outstanding quality of development. The expert review returned four standard designs for adjustment.

Those are the overall results, and it must be said that results of the expert review of designs showed an improvement on the whole in the work of design organizations and client's subunits. The percentage of technical documentation returned dropped appreciably. Nevertheless, the instances of preparation of inferior technical documentation which occur demand adoption of additional measures to improve design solutions, and more vigorous use of progressive technologies, equipment, materials and structures conforming to the latest S&T achievements, as provided by resolutions of the 27th CPSU Congress.

The design of the hangar building at Riga Airport, drawn up by creative collectives of the Lenaeroproyekt Institute (the general designer), TsNII [Central Scientific Research Institute] Proyektstal'konstruktsiya and the Lenpromstroyprojekt Institute (one of the most complicated and at the same time original designs in the design solution) can serve as an example of just such an approach to matters.

It provides for construction of a new hangar building for servicing Tu-154 aircraft (and the Tu-204 in the future) and a pumping station, expansion of the existing boiler room and so on.

Just what makes this design interesting? It contains progressive solutions permitting a reduction in the labor-intensiveness of construction projects and in physical resources, and an improvement in basic technical and economic indicators in comparison with projects and analogs built previously. For example, use of a large-span membrane surface permits almost a 20 percent reduction in metal consumption, and a modern roof cover [uteplitel krovli] cuts the materials input in half. A reduction in building volume and radiant heating make it possible to reduce the operating heat consumption by 25 percent.

The design was approved by the ministry management as excellent. It is planned to construct similar hangars in a number of other airports in the country, including the Ulyanovsk CEMA Civil Aviation Center.

Unfortunately, during the expert review one often comes across instances where technical solutions known to be backward are included in the designs. Let's take as an example the expansion of the Komsomolsk-on-Amur Airport. Work has been going on there for 15 years already. In this time the design, developed by the Dalaeroproyekt Institute, naturally has become obsolete. A check clarified that construction of an air technical facility intended for servicing the An-2 now is continuing. But the fact is that the Yak-40, An-24 and L-410 aircraft have been operated here for a long while. The question arises as to who will need a facility which will not be able to service this equipment?

It was decided to make necessary corrections to the design: replanning of the already practically built building, a provision for outfitting the air technical facility with new industrial equipment and so on. Dalaeroproyekt specialists prepared a design solution literally in a couple of months, and without an increase in estimated cost. Similar work also was done for the Yakutsk Airport. This naturally was only to the benefit of the work and there was an increase in effectiveness of capital investments in construction.

Many examples can be given where it is learned during expert review of designs that the estimated cost is inflated because of the use of incorrect design solutions and installation of costly equipment. The Sibaeroproyekt Institute, for example, planned to install the Czechoslovak-made D-2 light signalling system, which is not suitable for operation in low temperatures, at Mirnyy Airport.

Substantial comments were made concerning the design for expanding the air terminal at Barnaul Airport (Kazaeroproyekt Institute), where there was an especially poor state of affairs regarding formulation of estimate documents. The comments were discussed at a ministry conference with participation of the client and design authors. The inability of the client and Institute to react to the comments and suggestions of the builders was noted and appropriate resolutions were adopted. Design materials were returned for revision.

The requirements of norms also are violated in designing airfield surfaces. For example, the surface area of runway shoulders and taxiways was unjustifiably increased by 50,000 square meters for the design of Runway-2 in Kishinev Airport (Ukraeroproyekt Institute). This naturally could also lead to increased construction cost.

Special mention should be made of an instance of gross violation of established procedure in installing light signalling equipment at Yerevan's Zvartnots Airport, which led to a cost increase of R600,000. Construction of this project was being carried out under a design changed by the Armenian Civil Aviation Administration without reapproval in the Ministry of Civil Aviation. At the suggestion of the expert review, the guilty parties were given administrative punishment.

Yes, we are resolutely stopping attempts to unjustifiably increase the cost of construction or renovation of projects, but of course, only in those cases where this does not meet urgent demands of the day. For example, the advisability of increasing construction cost by R830,000 was approved by the ministry's expert review for the design of a laboratory training building for 1,500 pupils for the Frunze ATU [Air Technical School] of Civil Aviation. A conference hall unit with library and new equipment, which improved cadet training conditions, were added to the complex.

The state of affairs with development of estimate documentation of designs also cannot be called good. The compromising policy of some design institutes with unjustified demands of contract construction organizations resulting in estimates which account for expenditures (such as for the mobile nature of work performed by ordinary construction organizations which have no privileges for this) alerts us in particular. For example, excluded from estimate

calculations at the demand of the expert review were expenditures for the mobile nature of work on designs of the Tolmachevo Airport for R720,000, Mirnyy Airport for R680,000 and Barnaul Airport for R170,000.

Estimate calculations of expenditures for lump wage payment, long-service bonus, additional vacations, organizational recruitment and so on encounter many comments by the expert review.

From the Editors: The Examination Department identified many miscalculations in designing. We await a response from the Aeroprojekt Institute and other organizations mentioned in the article to the question: Why was there a serious cost increase in designs for a large number of projects? What is being done in the sector's design organizations to prevent similar instances in the future?

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CSO: 1829/226

## MOTOR VEHICLES AND HIGHWAYS

### GENERAL DIRECTOR ON PLANS FOR GAZ WORKS IMPROVEMENTS

Moscow ZA RULEM in Russian No 3, Mar 86 pp 2-3

[Interview by ZA RULEM correspondent L. Shugurov with GAZ [Gorkiy Motor Vehicle Works] Production Association General Director Nikolay Andreyevich Pugun under the rubric "By The Policy of the 27th CPSU Congress": "On the Agenda--Reconstruction"]

[Text] The Fundamental Areas of Economic and Social Development of the USSR for 1986-90 and for the Period to the Year 2000 is one of the most important documents reviewed and adopted by the just-concluded 27th CPSU Congress. It is a detailed program of accelerated development for the country, the realization of which requires the utmost intensification and increase in the efficiency of production based on scientific and technical progress. In the sphere of economics, the radical reconstruction and rapid development of the machine-building complex is envisaged among other tasks.

Our correspondent turned to GAZ Production Association General Director N. A. Pugun with the question of how the collective of the association will resolve its task in the 12th Five-Year Plan.

[Question] Nikolay Andreyevich, your association occupies a visible place among the largest production associations of the motor-vehicle industry. What a contribution it makes to the production of motor vehicles!

[Answer] GAZ produces the largest amount of trucks in the country, which moreover comprise more than 70 percent of the fleet of kolkhozes and sovkhozes. Some 11 plants of our association participate in the production of this equipment. Roughly a third are equipped with enclosed beds, and the rest are supplied in chassis form for the installation of special bodies: dump trucks, vans, tankers and others. They are manufactured by more than two hundred enterprises.

Since the beginning of production, our association has given the country millions of motor vehicles. All in all, we have mastered more than a hundred

models of automobiles and trucks over the years. They are well known in the Soviet Union and in more than 70 countries around the world.

[Question] The Fundamental Areas places before the machine builders the task of ensuring the creation and assimilation of the production of new-generation equipment that permits an increase of many times in labor productivity and substantially reduces materials consumption. How will GAZ resolve this task?

[Answer] The chief objective of our production in the 12th Five-Year Plan is diesel trucks or, rather, a family of vehicles. Prototypes of the GAZ-6008 dump-truck train and the GAZ-542 air-cooled diesel truck, for example, can be seen at the Avtoprom-84 [Motor-Vehicle Industry 84] Exposition in Moscow. This prospective model promises considerable advantages--fuel economy, a reduction in driver requirements, an increase in shipping efficiency. In order to master its output, however, a radical reconstruction of production is needed.

We will have to build a diesel-engine wing and two mechanical-assembly shops, as well as new forging, extrusion and foundry (non-ferrous casting) shops and a number of support structures. Furthermore, it is necessary to technically re-equip spring-forging production and all extrusion shops, as well as the wheel shop.

The opinion is heard that maybe it would be simpler to build a new plant on a bare spot than to undertake such a reconstruction. No. Its construction would require five times more funds. Thus, the path we have chosen is economically justified.

I'll speak now about increasing labor productivity and reducing materials consumption. We will install 370 automatic lines, 50 robot complexes and no fewer than 200 numerically controlled machine tools. This step will assist in raising work quality and will at the same time increase labor productivity in the principal shops of the motor-vehicle plant by one and a half times. And that's not all. As a result of the reconstruction, the number of people occupied with manual labor will be reduced by several thousand.

Much work has already been conducted in recent years on the technical re-equipping of foundry production, the introduction of new capacity based on modern automated equipment and improving and easing the working conditions of foundry workers. Imagine how hard, monotonous, dirty and low-prestige the manual molding is in foundry production. No one wants to do it. We undertook to design and manufacture highly efficient automatic lines for this process with our own manpower. Only they can ensure the high precision and quality of castings and rid the plant of the search for manpower for the foundry shops. The strictest time periods were established for this reconstruction--after all, every day of technical lagging inflicted irreplaceable losses and harmed quality. This step was difficult for us, but all the more joyous were the savings, technical, economic and social, achieved thanks to it.

Thus, as you see, the assimilation of new-generation vehicles inevitably requires the technical re-equipping of production, which resolves the entire purpose of the task: increasing quality and labor productivity, reducing labor-intensive operations, freeing up workers and reducing cost.

[Question] Now it is already possible, perhaps, to cite the time periods for placing the first and second phases of diesel production into operation, as well as to designate the scope of the technical re-equipping of which you were speaking.

[Answer] We plan to create the first phase of productive capacity for the output of agricultural dump trucks for operation in truck trains, and the diesels for them, in 1988. By the end of the five-year plan, a year early--the second phase, estimated for the full output of diesels.

How to evaluate the scope of the technical re-equipping? This is the largest reconstruction in the more-than-half-century history of GAZ. The area of the plant will increase by one and a half times after its completion. If you take into account that the technical level of production tooling will rise sharply, then I do not think it would be an exaggeration to call it a technical revolution. For the association, at least.

[Question] How is the economic saving from the transition to a family of diesel trucks reflected?

[Answer] First and foremost, a diesel engine is 30 percent more economical than a carburetor engine. Thus, the national economy will conserve 370,000 tons of fuel a year with the planned amount of new-vehicle output. That is first. Second, we will produce not individual trucks, but truck trains. Consequently, it will be possible to ship more freight and thereby free up 22,000 drivers. It is not an unimportant factor, if you take into account the limited nature of labor resources in the upcoming years, and the shortage of drivers in particular.

Now we will consider the GAZ-6008 truck train from another aspect, its consumer attributes--quality, to which the Fundamental Areas assign exceptional significance. It is very important that the vehicles intended for rural areas have an engine that operates on the same diesel fuel as all other motorized agricultural equipment--it simplifies fuel supply. Air cooling is universal for any weather or climatic conditions and means the least time expenditure on maintenance. It is also important that the transmission design allows the vehicle to operate in synchronized fashion with harvest equipment. It can thereby maintain a speed of 2-3 kilometers per hour for hours. The truck can confidently pass over plowed fields, country roads and mud, which is ensured by a reserve of tractive force and apparatus for interlocking the differential. In short, we will have to produce a fundamentally new truck which will be of great economic benefit to the national economy. Overall, it will surpass the expenditures on the reconstruction of the plant, of which I was speaking, to a considerable extent.

[Question] We were talking about trucks, but how will the production of automobiles be developed in the 12th Five-Year Plan?

[Answer] Before answering the question, I would like to emphasize that all GAZ-brand motor vehicles will be renovated and modernized in this five-year plan.

For example, along with the output of GAZ-6008 truck trains with a tractor with 4 tons of freight capacity and a trailer with 4.6 tons, the plant will assimilate the production of a modern truck with a carburetor engine and 3 tons of freight capacity.

Now automobiles. They are changing substantially, but we will not assimilate fundamentally new designs before 1990. We will be realists and not begin to re-evaluate our material capabilities. Nonetheless, the planning and manufacture of an experimental lot of new Volgas, which will conform to the modern level in their features, is projected in the 12th Five-Year Plan.

And what should realistically come up onto the conveyor before 1990? First and foremost, the 1986-model GAZ-24-10. We are planning to modernize it, having standardized it with body elements with the GAZ-3102. We will continue the production of the GAZ-3102 in the new five-year plan, envisaging the modernization of a number of its assemblies, and on the basis of this model we are projecting the production of its modifications.

And finally, the Chayka. It will get rear-wheel disk brakes, new front-end styling and other improvements.

[Question] You said that GAZ-3102 production is continuing. The editors have been receiving letters in which the readers refer to rumors that that model has been taken out of production.

[Answer] Those rumors are an utter fabrication. Its output has not stopped, and besides, there was no reason for it. On the contrary, we are manufacturing a few of them, approximately 8-10 percent of the total automobile production volume. The GAZ-3102 is not intended for taxi service or individual use, and it is natural that it is not encountered on the streets of every city.

[Question] Nikolay Andreyevich, the Fundamental Areas point the sector toward increasing fuel economy and reducing harmful effects on the environment. What does the association intend to do to resolve these tasks in the new five-year plan?

[Answer] I have already spoken of the economic saving from the use of diesels. In combination with the broad utilization of trailers, it will produce an approximate 50-percent reduction in fuel consumption. We also assign great significance to converting the engines of our trucks and automobiles to gas fuel. All in all, we will bring the output of vehicles operating on diesel and gas fuels to 25 percent of the total amount of vehicles produced in the 12th Five-Year Plan.

I want to emphasize that the exhaust gases of diesel and gas engines contain a smaller amount of harmful components than gasoline. And that 25 percent that was just cited is working on resolving two tasks: reducing fuel consumption and toxic-additive content.

As for trucks with gasoline engines, we, in collaboration with NAMI [Central Scientific Research Institute of Automobiles and Automobile Engines], the Volga Motor Plant, the Leningrad Lenkarz Carburetor-Armature Plant and other organizations, are projecting an average decline in fuel consumption over the five-year plan of 7-12 percent for trucks and 9-10 percent for automobiles.

[Question] Today, as is well known, much attention is devoted to accelerating the planning and finishing of new designs. In the face of such an extensive program for creating prospective models and modernizing existing ones as you were speaking of, this problem acquires especial significance for the association.

[Answer] Not simply especial, but decisive, since the Fundamental Areas, which discuss the acceleration of scientific and technical progress, formulate the task thus as applied on a national scale: reduce the time periods for developing and assimilating technical innovations in the national economy. We are now preparing to incorporate computer-aided design (SAPR) in the development of new designs. The association now has at its disposal its own testing complex with a concrete circular track, cobblestone and dirt roads and a section with variable roughness, as well as a laboratory with test stands and chambers. All of this taken together makes it possible to reduce appreciably the development times for the principal new models.

[Question] I would also like to hear what is being done in the association for increasing the quality and durability of the motor vehicles.

[Answer] Quality is a comprehensive concept. Reconstruction itself creates conditions for a higher level of parts and assembly manufacture. Worn-out dies, obsolete forging and mechanical-processing equipment, worker personnel turnover--these are the principal reasons for the appearance of production defects and a decline in quality. These reasons can be battled, perhaps, with local means, and we are doing that, but the issue must be fundamentally resolved overall. Reconstruction is just such a fundamental solution.

I do not deny the justice of the reproaches that are sometimes expressed by consumers, and I want to inform the readers of the journal that our collective is constantly struggling to increase product quality, and the further stabilization of this most important work indicator is currently proceeding at the enterprises of the association.

In the 12th Five-Year Plan, the association will also have to incorporate a broad set of measures directed toward increasing service life: by 20 percent for trucks and by 10-15 percent for automobiles.

[Question] It is well known that your association, aside from the principal products, manufactures many consumer goods. What is projected in this sphere?

[Answer] We will produce a modernized Shkolnik bicycle and, by the way, its production volume will increase by 30 percent. Furthermore, we will assimilate the small Elita washing machine and continue to manufacture scale-model (1:43) copies of motor vehicles, the range of which will increase to 10 varieties. Naturally, these are copies of GAZ automobiles.

Many readers of ZA RULEM do not know that we also make spare parts for heavy motorcycles. And among other important production I would cite the building of machine tools for our own needs, the volume of which will grow by 3.3 times by 1990.

[Question] On behalf of the readers of ZA RULEM, we wish the collective of the association the successful fulfillment of the projected plans and look forward to greeting the new GAZ-brand motor vehicles.

[Answer] Thank you for your wishes.

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## MOTOR VEHICLES AND HIGHWAYS

### INSTITUTE DIRECTOR OUTLINES TIRE PRODUCTION IN 12TH FYP

Moscow ZA RULEM in Russian No 3, Mar 86 pp 4-5

[Article by NII [Scientific Research Institute] of the Tire Industry Director and Hero of Socialist Labor P. Badenkov: "New Motor Vehicles--New Tires"]

[Text] Soviet products should embody the latest achievements of scientific thought, correspond to the highest technical, economic and consumer requirements and be competitive in the world market.

Such is the line projected by the party, the achievement of which is becoming a most important task for our industry and the long-term prospects for its development. A large share of responsibility for the fact that the products of the tire industry meet the highest criteria of quality lies with us, the workers of industry science. Today, at the start of the new five-year plan, there is reason to consider that the necessary work in progress for promising developments has been created in the sector.

The problems and goals before our industry are most closely connected with the direction of motor-vehicle industry development--our major client--and with progress in transportation-equipment designs.

In the previous five-year plan, the motor-vehicle builders increased the output of truck trains with KamAZ [Kama Motor Vehicle Works] tractors, and the production of a new family of tractors and semi-trailers grew at the Minsk Motor Vehicle Works. For the first time, the output of transportable dump trucks for agriculture was begun at the Urals and Kutaisi motor vehicle works. The efforts of the tire makers contributed to the assimilation of these motor vehicles.

In the current five-year plan, work incomparably greater in scope and tasks to be resolved will have to be done. Powerful, highly productive diesel ZILs [Moscow Motor Vehicle Works imeni Likhachev] and GAZs [Gorkiy Motor Vehicle Works] will come up onto the conveyor and will thus require new tires. Plants in Minsk, Kremenchug and Brezhnev will assimilate new vehicles. Finally, the assortment of passenger cars will be reformed substantially, in which a leading place will be occupied by front-wheel-drive models. This means that the workers of the tire industry will have much, very much, to do on planning, testing and preparing the production of tires in the near future.

Before speaking about specific models intended for broad industrial assimilation in the 12th Five-Year Plan, we will dwell briefly on the principal trends that are characteristic of motor-vehicle design development today and, consequently, have a decisive effect on tire quality needs.

For the truckers, this is an increase in capacity--both absolute and by unit of mass--and the growth of freight capacity and maximum speed. Truck trains with enclosed and semi-trailer tractors are used ever more broadly, wherein, say, the change in features for the modern truck train with a MAZ-5432 tractor compared to a train with a MAZ-504A tractor produced in the 1970s is expressed by the following numbers: the engine power grew by 55 percent, the truck-train mass by 40 percent and the maximum speed by 8 percent. The growth of proportionate parameters, in other words, and the growth in the power-to-weight ratio are also typical of the new passenger cars, the majority of them with front-wheel drive. Increasing the speed and braking features entails increasing the dynamic loads on the tires of both trucks and automobiles and putting them into more difficult and severe operating conditions. This means that increasing the power-to-weight ratio of transportation equipment should always entail a definite improvement in the operating features of tires.

But such a balance, naturally, is insufficient. In fact, a tire can only be modern with more improved characteristics than its predecessors, moreover under more intense operating conditions. The chief tasks to be resolved in the development of a new tire (or the modernization of one already produced) are: increasing the lifetime (tire life); decreasing materials consumption; and, improving other operating features.

The sectorial program for the five-year plan envisages increasing the consumer features of tires of all types. The basis of this is the further development of both theoretical and experimental research in the sphere of tire mechanics, as well as of design solutions and successes in the creation of new brands of rubber and improving production technology. Typically, the greatest efficiency in development is achieved when combining the knowledge and experience of the NII specialists and the plants. In the same manner, the times for assimilating new models into production are reduced and the technological and other capabilities of the producer plants are taken into account more fully.

In developing tires for TRUCKS, principal efforts, as has already been indicated, have been concentrated on increasing tire life and reducing materials consumption. The new models to be assimilated in the 12th Five-Year Plan are distinguished by good indicators. The size 240-508R of the U-4 model tire for the GAZ-53-12, GAZ-53A and its modifications and the sizes 320-508 and 260-508 for the MAZ and ZIL (model UD-1 tire) respectively can be noted as having the best parameters among them. The running time before repairs is 8-10 percent greater for them than for the currently produced KI-63, IYaV-12B and I-252B models, and they allow a reduction of 3-4 percent in fuel consumption. The 260-508R YeKh-12 (Yelks-12) model tire with a travel tread pattern is intended for KamAZ and prospective ZIL truck tractors. Aside from

the increased tire life and lower rolling resistance, it is distinguished from the well-known I-N142B by having 4.5 kg [kilogram] (9.4 percent) less mass, and thus materials consumption.

Further improvement of the operating features of tires requires fundamentally new solutions. The discussion concerns the use of metallic cord not only in the breaker strip, but in the tire body as well, and the transition to tubeless and reduced-drag designs. The application of steel cord in the tire body reduces internal (hysteresis) losses and heat liberation in the corners of the tire tread and walls. Rolling resistance is correspondingly reduced and, as a result, so is fuel consumption. These tires are more durable and permit higher speeds. They are very necessary for trucks occupied with intercity and international shipping. Four models of these tires have been developed and will be incorporated into the five-year plan: the 300-508A size (index D-ZMA) for long-haul MAZ-6422 tractors as well as the Volvo and Mercedes-Benz vehicles that we have; the 255-572R size (model U-1M) for the KamAZ-54112 and KamAZ-53212 tractors; the 11/70R22.5 and 10.00R20 (models D-1M and D-2M) for the new LiAZ-5256 [Likino Bus Works] city bus and Lvov intercity buses respectively. It is interesting that two of the indicated models (U-1M and D-1M) are tubeless.

The given designs are promising first and foremost for operations in regions where the hard-surface road network is developed. For confirmation, the experience of Western Europe can be cited: there, the share of tubeless models is approximately two thirds of total truck-tire production. It hardly need be said what reserves for the conservation of materials, labor and power are associated with the assimilation of these tires. It is restrained today, unfortunately, by the low rate of design work on equipping trucks with tubeless tires at motor-vehicle plants, as well as sluggishness in the organization of production of special one-piece rims, especially at the Motor Vehicle Plant imeni I. A. Likhachev.

The application of series 80 and 70 low-drag radial tires on trucks and trailers is promising and advantageous. An economic saving is achieved thanks to the high freight capacity of the tire with a substantially reduced mass. The output of 370/80R508-size tires (model NR-54) for the KAZ agricultural dump truck, developed in the 11th Five-Year Plan, will increase, along with the 310/80R508 (I-A232) for GKB-8350 and OdAZ-9370 [Odessa Motor Vehicle Assembly Plant] trailers. One 310/80R508-size tire on a trailer wheel replaces two 260-508R tires, while the intrinsic mass of the trailer is reduced by 170 kg thanks to the decreased mass of the tires and wheels.

As for PASSENGER CAR tires, two areas can be singled out in which the industry will work in the new five-year plan. First of all, the discussion concerns further raising the operating features and improving the quality of the already well-known models. The second most important area is the development of radial tubeless tires for prospective front-wheel-drive vehicles.

Series 70 and 80 low-drag radial tires with metal cord in the breaker strip will receive mass application. Consumers have already been able to evaluate the 175/70R13 model I-N251 tire for the vehicles of the VAZ-2105 and 2107

family and the 165/80R013 (MI-166 and its modernized version MI-16) for the Moskvich, IZh [Izhevsk Motor Vehicle Works], and VAZ-2102, 2103 and 2106. The 205/70R14 model ID-220 tire has produced good results on the GAZ-24-10 and GAZ-3102 Volga trucks. The passenger cars cited have longer life until repairs. It is advantageous to note that the use of tires with metal cord, with all other conditions equal, aid a fuel saving of 1-2 percent. They are all calculated for a maximum speed of 180 km/hr [kilometers/hour]--considerably more than motor vehicles can reach. This reserve is also an important safety factor.

The 165/70R13 model YeKh-85 (YeIks-85) tire for front-wheel-drive vehicles of the VAZ-2108 family demonstrated outstanding results in the process of all-round testing. Its running time until repairs is 60,000 km. It is interesting that the tire is 1.4 kg lighter overall than the well-known I-N251 for the Zhiguli, a gain of 16.9 percent. Naturally, the figures cited here do not exhaust all of the virtues of the new-generation tires and cannot reflect their effect on increasing the comfort and riding characteristics of motor vehicles.

The task of assimilating radial tubeless tires for passenger cars is as topical as it is for trucks. Only tires of this design that are established for GAZ vehicles are in series production today.

It is also planned to equip the VAZ-2108 vehicle with YeKh-85 tubeless tires as well. For the new models, the production of which will be developed in the 12th Five-Year Plan, several types of radial tubeless tires are being developed: the 135/80R12 size for Oka cars; the 155/70R13 for the ZAZ-1102 [Zaporozhye Motor Vehicle Works]; and, the 165/80R14 for the Moskvich-2141. Here we are taking into account the world trend: 85 percent of tires produced by the major firms of Western Europe are tubeless.

It should be emphasized, however, that the good features of the new tires can only be realized with their technically competent operation. Unfortunately, today even the simplest requirement--to observe the instructed amount for internal pressure--is very frequently violated. A systematic deviation of 20 percent from the standard, by the way, reduces the tire life by almost a third, and a tire which is at only 70 percent of the required pressure lasts only half of the determined time. Often motor vehicles are operated with various defects that reduce the service life of the tires. Technical incompetence and irresponsibility permitted by the employees of motor-vehicle facilities must be decisively eradicated.

Thus, the share of the most modern articles of a high technical level in the output of the tire industry will grow over the course of the 12th Five-Year Plan. Much must be done so as to accelerate substantially the rate of assimilation of new tires and raise the level of research and design development. For this purpose, it is essential to strengthen the cooperation of the specialists of the NII and the plants of the sector.

Closer intersectorial contacts are needed for creating progressive tire designs and continuously raising their operating characteristics--a creative union of the tire-industry workers, motor-vehicle builders and transportation workers, it could be said.

In the strengthening of this union, in mobilizing the creative energy of every employee, in combining the efforts of science and production, we see a pledge for the unconditional fulfillment of the tasks projected by the party in the sector entrusted to us.

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## MOTOR VEHICLES AND HIGHWAYS

### MORE DEBATE OVER BEST TRUCK TRANSPORT PERFORMANCE INDICATORS

Moscow IZVESTIYA in Russian 1 Apr 86 p 2

[Article by S. Pisarev, chief of Kuybyshevavtotrans Association, Kuybyshev, under "Cost Accounting Account" rubric: "What the Indicator Showed"]

[Text] The young hero of Mayakovskiy's familiar poem who asked his father what good and bad means would start to cry on hearing the answer that everything depends on evaluation criteria... The fact is that this is just how a father who was a trucker would have answered his little boy, having firmly learned that the truckers' labor is evaluated not by how good or bad it is, but only by the number of ton-kilometers.

But this indicator also has sunk into oblivion. From this year on the volume of shipments--tons--became the primary yardstick for the truckers' labor. It would appear that now everything will be fine, but the indicator changed and the problems remain.

Let's take a look with extreme objectivity at the essence of the problems through the eyes of the truckers. Does the new indicator promote acceleration in development of the national economy? Unquestionably.

But are the interests of the truckers themselves fully reflected in this indicator? Experience indicates that they are not. Obviously it is indeed "impossible to hitch a horse and a timid deer to the same cart." Judge for yourselves. The 12th Five-Year Plan provides for reducing the specific metal-intensiveness of vehicles and equipment by 12-18 percent. Many foremost industrial enterprises in fact already have been implementing this course for a long while, but the trouble is that under the new indicator a driver has no incentive for delivering lightweight freight.

Here is the most typical example. Up until 1980 set-making articles basically were delivered to the Volga Motor Vehicle Plant by rail. Then heavy container carriers with powerful MAZ and KamAZ tractors began delivering them. Now 250 truck tractors of three enterprises of the Kuybyshevavtotrans Association carrying 20-ton containers ply the most rational routes each day, delivering freight for VAZ [Volga Motor Vehicle Plant] from supplier enterprises.

The benefit of such well thought out and skillfully organized shipments is indicated above all by their economic effect: the national economy saves up to R1.5 million each year, and that's not all. Articles delivered "portal to portal" are hauled by hourly schedules with assurance of their complete preservation. Delivery goes around the clock, to the rhythm of the Volga Motor Vehicle Plant main assembly line. For this reason the motor vehicle plant has no need either for many days of warehouse stores of products or for additional loading and unloading platforms with equipment accessories.

This would appear to be nothing other than foremost experience. Not for nothing was it approved and propagandized by the VDNKh [Exhibition of Achievements of the National Economy]. But the experience was not disseminated further even among the Volga personnel themselves.

What is the matter? It is the same problem: such shipments are unprofitable for the truckers. The fact is that the yardstick of their labor and consequently the basis for their moral and economic well-being again are the tons, the plan for which they chronically underfulfill on the Volga Motor Vehicle Plant shipments. And just where are the truckers to scrape up these tons when the Volga Motor Vehicle Plant personnel not only are constantly reducing the metal-intensiveness of their articles by shifting to light alloys and plastics (and of course they are correct in doing this!), but they also are lightening the reusable containers themselves? Volga Motor Vehicle Plant personnel have begun to make containers not out of welded metal, but of iron mesh, which reduced container weight by half. Profitable? And how! Not only for the Volga Motor Vehicle Plant, but for the state as a whole... But just not for us transport workers, because shipment volumes in tons are reduced.

Now when the 20-ton containers are loaded to full capacity we can haul only 4-5 tons. By conscientiously fulfilling their obligations to Volga Motor Vehicle Plant personnel, truckers provide for a rhythmic, uninterrupted operation of the main assembly line, save the plan hundreds of thousands of rubles, but they themselves are left with a financial loss.

It is no secret that it is rumored that truckers are "dodgers" who allegedly only think now about how to take as much as possible on board... But this is not their fault, if you please, but their misfortune born of the planning principles themselves. Here before me are control figures for the Association for the 12th Five-Year Plan. For its final year of 1990 it is planned to increase the volume of shipments by almost 80 percent as compared with 1985. In other words, the assignment again is straightforwardly oriented on "more."

There is no question that a sensible, economically substantiated approach to the choice of optimal forms and methods of labor organization and the planning and management of production is a powerful incentive for labor collectives. It prompts people to work imaginatively. We transport workers followed with interest an experiment conducted in industrial enterprises. The new system came to us in 1984. Its essence lies in improving the rhythmic nature of service to clients and in making more effective use of transport with fullest account taken of mutual interests of clients and truckers. Now the driver's daily assignment provides for depersonalized quantitative indicators, above all the degree of a vehicle's loading corresponding to its load capacity, and the

time of delivery of freight over previously specified routes. That is to say, fulfillment of the order is the end result. The distance, condition of access routes to installations, and the presence of freight handling equipment at the client's place are considered without fail. The driver's workday now is determined by the route schedule and not the usual work ticket. This system differs favorably from the previous one. First of all, empty runs and fuel expenditure are cut considerably. Secondly, it is not necessary for the client to add to the driver's tons as was the case in the past in indulging the driver and for which it was necessary to pay. Now everything is aboveboard.

Two years of work under terms of the experiment permitted the collective of our Association's 1171st Motor Column not only to determine precise shipment volumes, but also to establish actual technical and economic indicators on the basis of rigid monitoring of the operation of rolling stock and elimination of additions.

Now clients are satisfied with our service. We too received certain dividends: we reduced transportation costs by R592,000; we freed 28 trucks and reduced operating costs by R170,000 by routing shipments and shortening the run; the fuel expenditure for the very same volume of shipments fulfilled before the experiment was reduced 727 tons; and drivers' overtime work was cut more than threefold. This is of course good. Nevertheless, these results could have been better had our enterprises (especially those operating under terms of the experiment) had a rational pool structure, and trailers and semitrailers above all, in shifting to the new indicator.

Both the experiment and the just introduced new indicator bared especially acutely the unresolved problem of transport layover for loading and unloading through the client's fault, where our enterprises lose over 23 million vehicle-hours annually, which is equal to the operation of the Association's truck pool for three days. Why does this happen?

In my view, this again is explained by the fact that the Minavtoprom [Ministry of the Automotive Industry] does not provide transport workers and their clients with the necessary assortment of auxiliary equipment. But the question arises as to just how one can reduce nonproductive layovers without such equipment. Fines don't help matters here; no one will be frightened by pumping money from one state pocket into another. In the last two years alone Association enterprises fined their clients over R2.5 million, but the client is not sensitive to conditional material losses. A different, sharp-cutting economic tool is needed. Which one?

It probably could be a fundamentally new indicator--the vehicle-ton-hour limited for the client. This economic stimulant would place the client in a dilemma every time: either he reduces the time for loading and unloading transport and thus saves "living" money, or he settles accounts with transport workers under a double tariff if he allows a layover of vehicles.

The experiment also revealed other weak aspects such as the following: inasmuch as mutual relations of client and transport worker have become more complicated, the need arose for economists to develop a fundamentally new

differentiated system of planning and accounting for labor inputs. There isn't one for now, and this has a negative effect on the planning and organizing of shipments, settlements with the client, and analysis of labor's end results and incentives.

But for now... For now we must efficiently resolve just one of the specific but very important problems by revising the principles for planning and accounting for our work with a change in the class of freight hauled, so that truckers don't try to haul something heavier in place of acutely needed freight.

Everyone wins from a solution to these problems. The client will get transport operating with high precision. Our automotive enterprises will get a developed system of economic operation and management with a real evaluation of their production activity.

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## MOTOR VEHICLES AND HIGHWAYS

### ECONOMIST URGES REGIONAL CONTROL OF TRUCK TRANSPORT

Moscow MATERIALNO-TEKHNICHESKOYE SNABZHENIYE in Russian No 4, Apr 86  
pp 62-65

[Article by M. Kaganskiy, economist, Yaroslavl, Kostroma, Vologda:  
"Transport: To Overcome Departmental Barriers"]

[Text] The division of motor vehicle transport into two categories, general-use, which is under the jurisdiction of republic motor transport ministries, and departmental, which is affiliated with associations, enterprises and organizations in various sectors of the national economy, has laid down the conditions for clearly differentiated realms of application as well. The first works essentially by contract and implements centralized freight delivery; the second is sector transport. It would seem that such a clear-cut model would make it possible to organize freight transport operations with maximal efficiency. The experience of Bryansk motor transport workers, which was already recounted in the journal MATERIAL AND TECHNICAL SUPPLY No 9, 1985, is the best confirmation of this.

The motor vehicle is most often used for so-called short-run haulage. Its realm is the city, oblast, and more rarely, the region. Apparently, it's not so difficult to introduce, within the limits of such administrative formations, transport of all freight in a clear-cut channel. After all, new enterprises do not appear that often and mostly the same consumers receive the output of enterprises in operation.

However, an investigation conducted by Minavtotrans RSFSR [Ministry of Motor Transport of the RSFSR] indicated that freight traffic in Russian Federation oblasts takes shape in many ways haphazardly. Certain transport routes and volumes are agreed upon with the consumers, but they are, in fact, implemented quite differently. By way of illustration, during 1 year, general-use motor transport carried more than 400 million tons of freight surplus to the plan. For sector drivers, the situation is still worse. Here, haphazard freight traffic flow in outside transport attains 50 percent of its total volume.

Why? In order to answer this question, you must study freight traffic on highways in the Yaroslavl, Kostroma and Vologda oblasts. A long line of empty trucks is already lined up on the suburban approaches to Yaroslavl

and at the dispatcher control station of the local territorial association for highways of the RSFSR Ministry of Motor Transport, which serves the Yaroslavl, Kostroma and Vologda oblasts. At such "toll gates" (and they have been created in the association's zone of operation at all highway junctions), they take work tickets from the drivers and dispatch the drivers themselves for incidental cargo stored up beforehand at industrial or supply enterprises in Yaroslavl.

"This is a real disgrace," R. Bestayev, chief of the Yaroslavl Transport and Dispatching Hub Enterprise of the highway associations, expresses his outrage. In Moscow oblast, there are 4,000 tons of freight for the area we serve. We can't take it out, there aren't enough vehicles. And here multi-ton KamAZs and ZILs drive empty."

And it is correct that the Bakovskiy Rubber Products Plant equipped five large-load ZILs with trailers for long haul trips. As was explained earlier, they go for components for a warehouse under construction at the Bakovka plant, the structure of which is situated at the Yaroslavl Industrial Carbon Plant.

Drivers simply answered the question as to why they drive empty: "They don't pay us to go for incidental freight; we're on an hourly wage."

At enterprises, it seems they don't even know the procedure for drawing up journey documents, wages and other fine points of transport?

The "geography of bad management" reigned at this "toll gate" in the most barefaced way; here it's possible to meet empty trucks literally from any oblast. Their route lay to the "Avtodizel" Production Association, the "Yarpolimermash" and tire plants, and other Yaroslavl enterprises. A column of trucks also lined up on the other side of the highway. Among them were motor vehicles from the very factories to which they were bound on their return trip. Every driver had a justification for this "vital" trip; here, raw materials ran out and there, an accident took place...

The reasons are hardly convincing. Departmental trucks expend as much time and gasoline on the road as Minavtotrans trucks. But these deliver rush freight, together with other incidental cargo and every trip turns out to be much more efficient. It's no wonder they prefer their own transport.

"What else can we do but drive our trucks?" The transport workers of the "Avtodizel" Production Association express their astonishment. "Don't Minavtotrans drivers transport one or two boxes of bearings and a pair of reinforced concrete slabs from another city? They will sub-group freight and achieve full utilization of motor vehicles. But we have no time to wait and we will drive."

And indeed, they will drive more than 300 of their own trucks to an enterprise. In addition, general-use transport is enlisted, by various directives, to haul scorched earth from foundries, as well as other by-products. In these circumstances, their own trucks are ready to set

out, at any moment, on long hauls to Gorkiy, Volgograd, Minsk and Kremenchug, in a word, to wherever they send for a "deficit item." Characteristically, the majority of departmental trucks are sent on a run essentially for "supply" freight. To put this another way, they are sent for that product which plants and manufacturers or supply and sales enterprise did not supply on time.

But are the reasons for trips by departmental vehicle drivers only in the "inconvenience" of general-use transport which achieves full-weight shipments? No. One of the fundamental reasons is that, for enterprises today, outlays for transport are practically unlimited. Attempts to clarify, with the managers of many industrial enterprises, which are real transport expenditures, ran into insuperable obstacles. Plant leadership simply didn't know their magnitude because they don't take them into account. And they recognize unanimously that if they would crystallize out transport expenses and establish limits, they would then conduct themselves much more circumspectly and would not run empty motor transport from the southern mountains to northern seas, as the saying does.

At first glance, the answer is paradoxical. But in this situation, it's quite right. A large portion of transport expenses is concealed in the depths of the enterprise's economic system; this has a bearing on the production cost of products and, in the final analysis, comes out of the pocket of the consumer, via the cost. In such a situation, you can allow yourself the luxury of driving empty vehicles for hundreds and thousands of kilometers. Several managers, however, consider this by no means a luxury, but a drastic necessity, and no financial sacrifice whatever is excessive.

"It would be impossible for us without our own transport," maintained the associates at the "Polimermash" plant. "So here we ran out of pig iron and sent a truck to the "Vtorchermet" base facility. It turned out there was no pig iron there. We drove all day. Do you mean this is how general-use transport will work?"

No, naturally, it won't. And why, in fact, is it necessary to work with such a crash work procedure? Do you mean that plant managers don't know that pig iron is in short supply? Of course they know. But instead of negotiating with the "Vtorchermet" base facility and "Yaroslavlavtotrans" beforehand, they preferred to shift all the troubles onto the drivers. First he searches for pig iron at one facility and then at another.

But there is, in fact, yet another way to solve the problem and that is to organize systematic, centralized haulage of pig iron from the base facility.

"Centralized haulage at our facility?" A. Platonov, manager of the Yaroslavl "Vtorchermet" Association was simply amazed by such a naive statement of issue. "Have you ever heard of such a thing. Pig iron delivery agents transport it themselves and pig iron users collect it. Besides, we don't have our own transport."

The last sentence is a lame excuse; the base facility can obtain motor vehicles at the same territorial transport association which serves all oblast consumers. And such a utilization of motor vehicles is economically justified; motor vehicles for "collection and delivery by the purchaser" will stop losing time in the wait for loading and unloading. But the whole problem is in this "always"; centralized delivery of pig iron imposes drastic obligations on facility workers, whereas now, they are, in practice, responsible for nothing. In fact, with centralized operations, rigid schedules will manage delivery and shipment and not the personal will of facility workers who make it handy for themselves and not for customers.

In contrast to "Vtorchermet", the "Verkhnevolsnabsbyt" associations at the Kostrom and Yaroslavl enterprises for metal products shipment are not hurt by transport. Along with these enterprises, their own transport service is affiliated with the Upper Volga Chief Territorial Administration of USSR Gossnab. And what is more, general-use transport is also enlisted. Here is where freight delivery should be maximally centralized, according to all canons of reasonable management. But it is here where the progressive form of service is poorly developed. Its level is approximately 70 percent. Every day, dozens of vehicles wait their turn. Many arrive here via "push rod" dispatchers and it happens that multi-ton trucks drive from a great distance for boxes of nails.

"You'll spend the day at the Kostroma shipment enterprise and although you'll obtain metal and you won't leave empty, without fail they'll distribute it elsewhere." A. Shveygoron, master of the transport sector of the Kishinev plant for the paper making machine industry, who was sent here from Ivanovo where the main enterprise of "Verkhnevolgmetallosnabsbyt" is located, expresses his "joy". And in Ivanovo, you can't obtain anything anywhere; there is no procedure here whatever. "What will they think up next," he continues. "Sub-departmental enterprises, which are located in four oblasts, have specialized in different inventories of metal. You have to fuss about one type of metal in Ivanovo, another in Yaroslavl, a third in Kostroma and a fourth in Vladimir. (As was recounted, the same thing was done with carbonic acid at industrial enterprises.)

Well, we never! The Gossnab subdivision, which is authorized to organize progressive forms of consumer service in the performance of its official duty, creates confusion with its very own hands.

"It's the drivers' fault," advance the managers of shipment enterprises. "They refuse to haul metal beyond the limits of a 20 kilometer zone and this is how collection by purchaser flourishes."

I am familiar with the contract on transport service. V. Rastoropov, deputy chief of the Upper Volga Chief Territorial Administration, cut orders submitted for transport work by managers of these enterprises in half, with his own hand. In fact, in accordance with them, drivers allot fuel. In order to keep within allotted limits, it's necessary either to reduce shipment volume or decrease the transport leg. General-use transport drivers chose the lesser of two evils. However, transport

workers from the territorial administration who service metal shipment enterprises, also took the same action. Now all transport which goes beyond 20 kilometers must be implemented by transport from industrial enterprises and organizations or collections by purchaser must be engaged.

Seemingly, it would be quite simple to place a motor vehicle dispatcher, along with a dispatcher from the supply and sales organization at the shipping enterprise, as this was done in Bryansk and haphazard traffic flow was successfully directed into an organized channel. There is practically no expense whatever and as the experience of Bryansk truckers shows, results are very high and labor productivity is sharply increased.

I asked the managers of industrial enterprises and supply and sales organizations if they were familiar with the circumstances of the Bryansk experience with centralized service. I more often heard a negative, rather than an affirmative response. In Yaroslavl and Kostroma, drivers and Gossnab system workers don't show initiative and personal interest in development of this method.

"If they order it from above, then consequently, we'll develop centralization," explains V. Romanov, director of the Kostroma enterprise for metal products shipment, "if they draft a plan, we'll implement it."

It's hardly possible to expect significant improvement with such an approach to the matter.

But here in Vologda, for example, they aren't waiting for an order from above. In the "Vologdaavtotrans" [Vologda Motor Transport] zone of operations, load dispatching stations were organized at major enterprises and cargo generating projects; they utilize not only their own transport but also it is true that they enlist, albeit hesitantly, departmental trucks which are not in use at a given moment.

Drivers from the Yaroslavl, Kostroma and Vologda oblasts have displayed good initiative and have maintained a regional transport balance, which is reflected in the vehicle fleet, shipping and receiving volumes and many other considerations, which can help reorganization of freight traffic flow. It has now become as clear as two plus two that every oblast has a large surplus of motor vehicle transport. At the same time, every department today complains of a chronic shortage in this area.

What is the reason for this phenomenon? First of all, it is that chaotic freight flow "eats up" motor transport resources. In fact, many enterprises and organizations do not utilize motor transport as designated. Time and again, you encounter trucks on highways and streets from various agricultural firms which are carrying reinforced concrete slabs and bricks. Why do they turn up on streets far from their clients, the kolkhozes and sovkhozes, taking "bread" from general-use transport? And where is the hay, fertilizer and specialized technology they are designated to transport?

Managers of Kostroma and Vologda associations of USSR Gosagroprom [State Committee for the Agriculture Industry] have attempted to show that it is precisely with agricultural transport that the sub-departmental motor transport enterprises are concerned and that construction freight is incidental. However, the facts in no way square with their assertion. In less than half a year, selectively verified Vologda organizations transported approximately 30,000 tons of freight by orders of mobile, mechanized rigs, construction and installation organizations and enterprises from half a dozen ministries and departments which don't appear on lists of contractual customers of local transport workers. Among them are Mintransstroy [Ministry of Transport Construction], USSR Minstroy [Ministry of Construction] and USSR Minenergo [Ministry of Power and Electrification], which have their own motor-transport. At this time, centralized transport was diverted from shipment of general designation products to transport of peat, mineral fertilizer and other agricultural freight.

Today, the obispolkoms [regional executive committee] load the lion's share of surplus-to-the-plan and "emergency" transport inside the region onto general-use transport. Meanwhile, by way of illustration, the "Vologdaavtotrans" share of the whole oblast truck fleet is only 6 percent, while the "Yaroslavlavtotrans" and "Kostromaavtotrans" share is 90 percent; its transport volume in Vologda is 14 percent, while it is 25-28 percent for its neighbors.

I spoke with many workers from local organs. It became clear that they can't and, at times, also don't want to probe deeply into the business of departmental transport. Why? Strange as it may seem, the reason for such a situation is patterned in the structure of soviet organs themselves. There is no transport department in city or oblast ispolkoms. Such a department was only recently created in the Vologda oblast plan. But at this time, it is only concerned with general-use transport. They don't have time for it; ispolkom sector departments, which concentrate on industrial, construction and agricultural enterprises, turn all their attention only to basic production. In essence, they overlook the inefficient use of departmental transport. Thanks to every ispolkom, there is special, coordinated advice, but they are essentially concerned with haphazard work of railway and river workers and drivers.

Instead of adjusting the operations of the whole transport system in the territory of the oblast, ispolkoms take the path of least resistance and "press" into service those who sufficed earlier, and they are workers in centralized transport. It turns out that nearly 90 percent of the oblast vehicle fleet belonging to departments remains outside the field of view of local transport organs. It's not surprising that in these conditions, departmental transport workers feel free on the highways, which creates haphazard transport. With their non-intervention, ispolkoms encourage uncontrolled use of motor vehicles belonging to various enterprises and organizations.

It is evident that a regional headquarters for transport management must be created under the ispolkoms which would take upon itself control over efficient utilization of motor transport, independent from its departmental affiliation. The seeds for such an experiment exist; during the harvest campaign period, centers for management of agricultural transport are organized in every rayon. After all, who prevents extension of their work in time and "space" in all aspects of transport? However, workers from local organs try to convince use that they have neither the people nor the authority for such work.

Meanwhile, the authority is there. It is envisaged in the well-known resolution of the CPSU Central Committee and USSR Council of Ministers. It is directly expressed in this document; the ispolkoms of kray and oblast councils of people's deputies must examine, at the earliest possible date, the issue of efficiency of use of motor transport means in departmental motor transport management. This document came to light 3 years ago. But as is evident, it has not yet become a program for concrete eaction anywhere.

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12976/12781  
CSO: 1829/200

## MOTOR VEHICLES AND HIGHWAYS

### EXPERIMENT WITH DIFFERENT TRUCK TRANSPORT PERFORMANCE INDICATORS

Moscow PRAVDA in Russian 20 May 86 p 2

[Article by G. Yastrebtsov: "Freight En Route: Economic Experiment in Truck Transport"]

[Text] Several years ago when I was on detached duty in the Urals, I noticed a truck with a Moscow Oblast number at the plant gate and couldn't keep from going over to the driver: "Wouldn't it be simpler to haul by rail over such a distance?" The jovial person, who was wisely wiping the cab's dirty windows with a rag, willingly responded: "I try because of the plan. If necessary, I can even make a dash to Kamchatka. Our job is such that when wheels are rolling the money flows, but if not we're on the rocks."

On returning to Moscow I related that conversation to V. Korniyko, one of the heads of Mosoblastotrans [possibly Moscow Oblast Motor Transport]. Vladimir Alekseyevich smiled sadly:

"We don't send people and vehicles thousands of kilometers for our health. The truckers have been placed in difficult conditions by an obsolete economic mechanism which clashed with reality long ago. On the one hand we try to satisfy clients' demands and on the other hand we try not to harm ourselves. Our well-being directly depends on the volume. We (both managers and workers) suffer financially if we don't pile up the number of ton-kilometers set by the plan. More and more of these ton-kilometers are planned for us each year 'from what has been achieved'."

"It turns out that work is done for the sake of the work process itself?"

"That's it. What do the ton-kilometers reflect? Nothing except volumes of moving something over a certain distance. This indicator is in no way connected with end national economic results. There always is the opportunity of grinding out the ton-kilometers necessary for the plan without having fulfilled the order of some customers by using others which are more profitable and compliant."

"What can be done?"

"Reject unsuitable indicators, and decisively. Plan the truckers' work so that they have a vital interest in sensible, diligent hauls and timely delivery of the complete products list of freight. Many people now are racking their brains over this. I and A. Fayzulin, deputy chief of the planning and economics administration of Minavtotrans [Ministry of Motor Transport] RSFSR, also proposed our own version of an anti-input [protivozatratnyy] indicator: the volume of transport services in paid truck ton-hours."

"What is its essence?"

"To put it briefly, paid truck ton-hours characterize the time of vehicles' beneficial use for hauling freight and should be an economic incentive to truckers to fulfill any customer orders, and not just profitable ones. Neither truckers nor freight shippers will have an incentive for adding extra tons and kilometers. But this is on one invariable condition. The state plan must be formulated on the basis of contracts with clients so that it rests on the actual need for shipments. Then the harmful principle of planning 'from what has been achieved' also will disappear. I believe this is what is needed now, but you won't go far on enthusiasm alone. They stubbornly continue to plan our work in ton-kilometers."

Yes, another two years went by before the new indicator began to make it in places, slowly and with difficulty. An economic experiment began from the beginning of 1984 at 24 motor transport enterprises of eight of the country's ministries and departments (including in ten motor transport managements of the Ministry of Motor Transport RSFSR). It was formulated not under the auspices of Gosplan, but of USSR Goskomtrud [State Committee for Labor and Social Problems]. Hence its primary objective of improving the system of drivers' pay. But this naturally can be achieved only by raising the people's incentive for more effective use of vehicles, for raising labor productivity, and for better service to clients. Here is where the truck ton-hour proved useful.

"The new approach to matters helped above all to use means of economic pressure to shake off the burdensome weight of additions and identify the volumes of transport work actually necessary," says V. Medvedev, deputy minister of motor transport RSFSR. "It became quite clear to us that previously these volumes were constantly inflated when the shipping plan was formulated, and volumes were especially inflated for shipping freight of a so-called noncommodity nature (the overburden of rocks, industrial waste and so on). For example, the volume of soil hauled by Motor Column No 1109 of Glavzapstroy [Main Administration for Construction in Western Regions] of the USSR Ministry of Construction in 1985 was lowered by hundreds of thousands of tons in comparison with 1983. In other words, the vehicle wheels began to roll less and clients were satisfied: they received full transport services.

Isn't this a paradox? No! Here is the comment by Ya. Demidov, chief of the Otdelpromstroy Administration from the city of Kurgan: "Previously truck drivers who hauled slurry around to construction sites would not keep within the normative time fairly often, especially during unloading. The old system of relationships would force these forced idle times to be covered by

additions in transport documents. Now, however, additions are precluded with calculations in truck ton-hours. The norms agreed upon by builders and transport personnel permit giving drivers realistic assignments. People have ceased to pursue 'volume' and waste fuel."

There are many such comments. Additions have disappeared, vehicle mileage has been reduced, and fuel consumption has been cut--these are all appreciable results of working in the new way. Let's take a look at the figures. In 1985 the freight shipping plan was fulfilled by 99.8 percent (in comparison with 86 percent in 1983) for contracts made by Ministry of Motor Transport RSFSR enterprises participating in the experiment, the number of vehicles was reduced 4.7 percent, the number of drivers by 2.7 percent, and fuel consumption by 18 percent. The reduction in transport costs of shippers is valued at R5.9 million.

As we see, this is a substantial saving. If not just isolated enterprises, but every motor transport management in the country would begin to operate in this way the effect will increase by many times. But not everything is put together easily and simply. The experiment has not only fervent adherents, but also influential enemies. It stands to reason that the majority are not open, but are hidden. Today who would declare frankly that he is against progressive changes? But some are not beyond entangling the innovation in vague explanations, fencing it off with cautious instructions, and playing the objective person.

They say approximately the following: In principle the matter is well conceived, but unfortunately not everything is sufficiently weighed and thought out as yet. This is also apparent from the results: specific expenditures for hauling freight under terms of the experiment went up by almost a fourth, and the specific fuel expenditure increased for the same ton-kilometer. This, they say, is not good.

Is there truth in such assertions? Yes, but not the whole truth. I will explain. The increase in specific fuel expenditure in reporting was not a surprise for the organizers and participants of the experiment, because this increase is an echo of volume, a direct and unavoidable result of a reduction in volume of freight turnover in ton-kilometers and the elimination of additions. In fact, under the new terms, after satisfying the clients' needs, the motor transport managements cut absolute fuel expenditure and received not an imaginary, not a conditional, but a fully tangible, real saving. The following figures can be cited as an example: the annual fuel expenditure in Leningrad motor columns Nos 1441 and 1109 dropped by two and three million liters respectively.

The experiment is producing positive results. Why not make them common property faster? But here is how events are developing. Ton-kilometers finally "went out of circulation" in truck transport with the new year, being replaced by tons. But the fact is that this indicator also has a clear-cut volume "filling." While motor transport enterprises previously would choose a longer route in pursuit of ton-kilometers, now their ideal is shorter distances and heavier freight. Light freight becomes unprofitable even if they take it to the ends of the earth.

Here is a fact for illustration. The Experimental Bakery Equipment Plant in the city of Mytishchi, Moscow Oblast, makes yeast vats and separator-packers [delitel-ukladchik]. People at the plant try to ensure that the product is not only as reliable and productive as possible, but also lighter than before. This meets modern demands, as the 12th Five-Year Plan provides for a reduction in specific metal-intensiveness of machinery and equipment by 12-18 percent. For truckers now to take articles of the Mytishchi Plant means reducing the effectiveness of hauls (on paper of course, and in accounting documents). The old story repeats itself. Volume doesn't wish to voluntarily surrender its position.

"It's time to extend the experiment not only laterally, but vertically as well," writes M. Starovoytov, chief of Motor Column No 1441 of Lenpromtrans [exact expansion unknown], in PRAVDA. "Otherwise it will make no sense. We are convinced of the benefit of the truck ton-hour and want no other indicator. But only two enterprises in our city have shifted to work in the new way, while all higher organs--the territorial association, main administration and ministry--remain under the old terms and live with the previous interests. And so a disparity results: we place fulfillment of transport services and contractual obligations with clients as paramount, but a growth in volumes is demanded of us, growth at any cost. The perniciousness of such an approach to matters is obvious. Can't the USSR Gosplan Transport Department really see this?"

The question can be regarded as rhetorical. In October 1984 V. Karpunenkov, then deputy chief of USSR Gosplan Transport Department, spoke in Mosoblavtotrans. Among the valuable advice which he gave truckers was the following: "Experiment with drivers' wages, but don't touch indicators for planning and evaluating the work of enterprises. Plans for 1985 have been given in ton-kilometers, and no one will change them. Plans will be established in tons from 1986 on." No commentary necessary, as they say in such cases.

Gosplan RSFSR also has become accustomed to volume indicators. D. Dudnev, deputy chairman of the republic Gosplan, is inclined to regard the present experiment as "harmful" and as not taking into account some kind of specific feature of the sector. One needn't be surprised at this. Dmitriy Ivanovich headed Mosoblavtotrans in the 10th Five-Year Plan. It was in those years that this organization achieved the highest growth indicators in shipping and freight turnover volumes. In the pursuit of ton-kilometers the best vehicles were removed from local hauls and switched to interblast and even interrepublic routes. Freight turnover grew by leaps and bounds. On the other hand, it dropped sharply on local routes, which was not slow in having a negative effect: suburban Moscow enterprises waited long and often in vain for the trucks to haul finished products. A specific feature of the sector?

Work for the sake of the work process itself... "Inflated" growths and gigantic volumes of benefit to few...

Managers who take a narrowly bureaucratic position toss out a major trump-card: We are in favor of cost accounting! Motor transport managements on cost accounting are obligated to make a profit.

They are, who will dispute it! But not at the expense of their clients and not to the detriment of the national economy. Our economic system is a unified one and the vessels are connecting. What sense is there in having just as much flow out of one faucet as is delivered through another?

In Kuybyshev recently I chatted with truck drivers and inquired their opinion of the reorientation and the experiment in truck transport. The response was unanimous: "A worthwhile matter. The clients are satisfied and we have no grudge. But the paid truck ton-hour demands honest and precise work not only of us drivers, but also of our managers and of those whom we serve. The 'scissors' are too large for now. Layovers of transport in loading and unloading are growing through the clients' fault. It is also time to place the consumers of transport services under terms where the customer knows and sees that violating a contract and dragging work out beyond the prescribed time means hitting at his own pocket. A limit on transport services must be planned. For now customers practically uncontrollably write off all shipping costs on the production cost of products."

Fairly stated. Now economic measures specifically are needed to reduce to a maximum the national economy's costs for motor transport.

A number of territorial associations of Ministry of Motor Transport RSFSR, motor transport ministries of several union republics and Glavmosavtotrans [Main Administration of Motor Transport of Moscow City Soviet] shifted to new terms of economic management beginning in January 1986, but results of the experiment were not taken into account here. There is still no total clarity regarding the economic indicators, although it is high time for it to be determined.

Much work lies ahead. Intensive methods demand serious interpretation and scientific substantiation of the planning and practical organization of shipments.

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## RAIL SYSTEMS

### FURTHER LIGHT RAIL TRANSIT SYSTEM DEVELOPMENT PLANNED

Moscow GUDOK in Russian 2 May 86 p 4

[Article by Boris Kolesnikov of APN [NOVOSTI PRESS AGENCY]: "The Streetcar of the 21st Century"]

[Text] We have streetcars in 110 cities in the country. In 1985 the total length of streetcar tracks was nearly 100,000 kilometers. Annually more than 8 billion passengers use this type of public transportation. It's economically sound in terms of energy expenditures, it's the cheapest and most spacious, and it's ecologically clean. However, a streetcar is relatively slow and noisy. Soviet specialists are conducting active studies on eliminating these shortcomings.

How will passengers see the streetcar on the threshold of the 21st century? Candidate of Technical Sciences SERGEY PAVELYEV, laboratory chief of the All-Union Scientific Research Institute of Railcar Building, responds to this question:

"The main direction of our work is extension of the 'light rail transit' (LRT) type of lines. In this case a streetcar approaches the metro in terms of movement speed and trip comfort. In this regard track construction cost is considerably less. Its energy consumption is lower too.

The first LRT routes in our country were built in Kiev and Volgograd. On the Kiev line (9 kilometers) there are no intersections with other transportation flows. The operating speed here reaches 65 kilometers per hour. In Volgograd (length of the lines is 13 kilometers) for the first time in our country over 3 kilometers of the route were built under the ground, and the surface section has a detached roadbed. Systems for automatic speed control and automatic locomotive signalling make it possible to get up to a speed of 80 kilometers per hour. The traffic rate is 28 pairs of trains per hour.

At the present time there are LRT lines in Leningrad, Minsk, Riga, Tallinn, Lvov and other cities of the country. In comparison with the conventional ones they make it possible to increase the carrying capacity of routes from 5,000-8,000 to 12,000-25,000 passengers per hour. And although LRT requires substantially greater initial costs for construction, these expenditures are fully justifiable

since passengers' time losses on trips are almost halved and they reduce the transportation fatigue of people as well."

"It's advisable to create special rolling stock in order to use the advantages of LRT lines more fully," Sergey Pavlyev continues. "We're considering two basic types as prospective railcars: a 4-axle one with a higher technical level of performance, reliability, economical operation and comfort, and a 6-axle and 8-axle articulated joint one for routes with large passenger flows (a capacity of 160, 220 and 300 passengers respectively).

One might call the eight-axle articulated joint railcar that is being planned with increased capacity a real streetcar train. It's designed for LRT lines where the carrying capacity of conventional rolling stock doesn't satisfy requirements.

In terms of design features this model is standardized with the four-axle railcar to the maximum extent possible. The urban minitrain is made in the form of three sections that are connected between themselves. Its capacity is twice that of the four-axle version. There is one more notable design feature: the front and rear doors are located on the flat, lateral portion of the body and not on the bevel in the traditional manner. Thanks to this the view of the stopping area or the platform is improved, and that increases the safety of passengers when getting on and off.

A lot is being done too in the area of dealing with noise. For example, an experimental section is being built in Moscow where the rails are laid on a concrete foundation, new shock absorbers are provided for, and resistance welding of rail joints is replacing bolts. As a result, as the scientists believe, the noise level will be halved.

Speed, comfort and noiselessness--these are the three behemoths on which the future of our streetcar will be built."

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CSO: 1829/224

## RAIL SYSTEMS

### ER-29 ELECTRIC TRAIN TESTED IN VILNIUS

Moscow GUDOK in Russian 11 May 86 p 1

[Article by L. Lyubimov in Vilnius under "Reporter at the Site of Events" rubric: "First Steps of the ER-29"]

[Text] The new ER-29 electric train, which was created by the Riga railcar builders, completed its first independent run on the local section of the Vilnius department. "The results are reassuring in terms of running and traction characteristics," Candidate of Technical Sciences A. Dotsenko, who is chief of the traction electrical equipment NII [scientific research institute] for railcar building attached to the plant and who participates in start-up and adjustment operations, said with optimism. The "novice" already is advantageously distinguished from its predecessor--the ER-9E--in terms of outward appearance. One is attracted by the unusual location of the signalling headlights and searchlights, and the cab of the head electric sections and the railcars themselves are extended with enlarged doors and more spacious covered platforms. Electrical equipment is arranged more uniformly under the sections and in the covered platforms.

In a conversation with me prior to the commencement of testing Chief Designer Ye. Kalnin noted that this train was created on a fundamentally new basis. And for the time being it's the only model. There are also units in the world practice of similar counterparts. The maximum design speed of the ER-29 is 120 kilometers per hour. More powerful engines with regenerative braking are installed on the new train. Equipping the electric sections with electronics makes it possible on a run to save 30-40 percent more electrical power in comparison with trains that are being operated at the present time. Special pulse transducers on the wheels will assist in preventing skids and jamming of the wheel pairs and, consequently, in providing for their reliability and long term in operation.

The fact that capacity has increased by almost 400 passengers in the new electric train is also no less important. The more spacious covered platforms and doors will considerably speed up getting off and boarding. The stopping places at stations will be reduced. Concern for the passenger is being felt in everything. There are soft seats and fluorescent lighting in the railcars and miniature tables by the windows. The designers also were concerned for the locomotive crew. The designers uttered their own word here. An air conditioner was

installed for maintaining the necessary temperature, and there is a refrigerator. The engineer and his assistant have comfortable, vibrationless seats.

Along with start-up and adjustment operations the new train is faced with "rolling up" 5,000 kilometers in Vilnius in local traffic, following which it will take its place at the international exhibition of railway technology that is opening in Moscow (at Shcherbinka). And then testing and working out optimum conditions will be continued once again. Inasmuch as there are a lot of electronics in the new rolling stock that are being used for the first time in operation, an entire year has been set aside for plant start-up and adjustment operations. Specialists consider this train the train of the future.

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CSO: 1829/224

## RAIL SYSTEMS

### CEMA-ORIENTED RAILWAYS COOPERATION MEETING IN BULGARIA

Moscow GUDOK in Russian 31 May 86 p 3

[Article by TASS Correspondent V. Kononenko in Sofia especially for GUDOK:  
"OSZhD [Railways Cooperation Organization] Extends Cooperation"]

[Text] THE 14TH SESSION OF THE OSZhD MINISTERIAL CONFERENCE IS OPENING IN THE BULGARIAN CAPITAL. MANAGERS OF THE TRANSPORTATION MINISTRIES OF THE NRB [PEOPLE'S REPUBLIC OF BULGARIA], VNR [HUNGARIAN PEOPLE'S REPUBLIC], GDR, KNR [CHINESE PEOPLE'S REPUBLIC], KNDR [KOREAN PEOPLE'S DEMOCRATIC REPUBLIC], CUBA, MNR [MONGOLIAN PEOPLE'S REPUBLIC], PNR [POLISH PEOPLE'S REPUBLIC], SRR [SOCIALIST REPUBLIC OF ROMANIA], SRV [SOCIALIST REPUBLIC OF VIETNAM], USSR AND CSSR ARE PARTICIPATING IN ITS WORK. THE CHAIRMAN OF YUGOSLAVIA IS ATTENDING AS AN OBSERVER.

Questions on improving the operating efficiency of transportation systems in socialist countries are being examined at the session. Particular attention is being devoted to the extensive use in this area of the achievements of scientific and technical progress that are called upon for increasing volumes and improving the quality of shipments.

The session participants emphasize that the 30 years of experience of OSZhD activities confirm their important role in the matter of developing and strengthening cooperation of the socialist countries in the area of railway and motor vehicle transportation and highways, which contributes to an intensification in the national economic systems of the organization's member countries. This is manifested especially in the example of the bilateral cooperation of railway workers in the Soviet Union and Bulgaria.

The comprehensive program that was approved for the development of economic, scientific and technical cooperation in the area of transportation until the year 2000 between the USSR and NRB provides for the joint creation of automated control systems in transportation and industrial processes and during the first stage the establishment of ticket offices in Sofia that are connected to the "Express-2" system operating in Moscow. For the long term, it's planned to connect the NRB's national seat reservation system to a similar system in the USSR, and that will provide for automated execution of travel documents in international passenger service.

At the present time, the task is being set to sharply improve the operating organizational level of transportation systems in providing for the ever-increasing demands for shipments. OSZhD must play an indispensable role in this. A conversion in planning both long-term and current operation of its organs to a special programmed method with the allocation of immediate, priority problems--on the development of which the efforts of the organization's members are being concentrated right now--is being accomplished within the framework of this organization. At the session they specifically discussed the possibilities of assimilating more improved processing methods at border railway stations and creating the conditions for the organization of a joint data communications system. Importance was attached as well to the coordination of OSZhD activities and other international transportation organizations.

The session participants are faced with making important decisions on improving the structure of OSZhD and the methods of its operation.

Meetings of the USSR Minister of Railways N. S. Konarev took place in Sofia with the transportation ministry managers of a number of socialist countries. Matters of bilateral economic, scientific and technical cooperation in the area of railway transportation, as well as measures on implementing the shipping plan for 1986, were examined during them.

G. Atanasov, chairman of the NRB Council of Ministers and a member of the BKP [Bulgarian Communist Party] Central Committee Politburo, received the delegation leaders who are participating in the work of the OSZhD session.

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CSO: 1829/224

## MARITIME AND RIVER FLEETS

### OFFICIALS ON CONTINUING INTERLIKHTER ORGANIZATION GROWTH

Moscow MORSKOY FLOT in Russian No 3, Mar 86 pp 54-59

[Discussion with Interlikhter General Director Vladimir Petrovich Ushakov, Deputy Directors G. Kolimar and Jan Ganusek and Chief Engineer Kh. Khristov; materials prepared by A. Klementyev under the rubric "Abroad": "Interlikhter: A New Stage of Development"]

[Text] The Long-Term Dedicated Cooperation Program (DTsPS) for the development of the transportation links of the CEMA member countries, adopted at the 33rd CEMA Session in 1979, envisaged the further intercoordinated development of transportation systems and their ever closer interaction based on modern technological equipment and leading technologies. Among the DTsPS measures was the development of a new international navigational business enterprise, Interlikhter, an agreement for which was signed among the governments of Bulgaria, Hungary, the USSR and Czechoslovakia as early as 19 May 78.

The governments of the four socialist states along the Danube that formed Interlikhter determined as its chief aim the fullest and most efficient satisfaction of the requirements of their countries for the shipping of export cargo by way of incorporating modern progressive shipping technology using a LASH-ship [lighter aboard ship] system. It was envisaged that the enterprise would ship not only the export cargo of the countries that signed the agreement, but the cargo of charterers of other countries as well. It was granted great independence in commercial activity in international shipping.

In order to provide for the operational, technical and business activity of Interlikhter, a statutory fund was created from the contributions of the participants. The management organ of the enterprise is the Council, which consists of plenipotentiary representatives with equal rights of the Bulgarian River Shipping Company, the Hungarian Joint-Stock Shipping Company, the Soviet Danube Shipping Company and the Czechoslovak Danube Shipping Company. Interlikhter operates according to its own plans, taking into account the economic interests of the founding countries, but receiving no plan targets from the state organs of those countries. Its plans are approved by the Council, and all activity is built on the principles of full profit-and-loss accounting. Management of Interlikhter is carried out by a general director

on the basis of one-man management. The management staff consists of an equal number of highly qualified specialists from Bulgaria, Hungary, the USSR and Czechoslovakia.

The journal MORSKOY TRANSPORT has already twice covered, in 1980 and 1982, the activity of this interesting business enterprise, which is a qualitatively new stage in the development of socialist economic integration in the sphere of maritime transport. At the end of 1985, our special correspondent again visited the headquarters of Interlikhter in Budapest and met with the management of the enterprise. General Director V. Ushakov (USSR), his deputies G. Kolimar (Hungary) and J. Ganusek (Czechoslovakia) and Chief Engineer Kh. Khristov (Bulgaria) participated in the discussion that was held.

Editors: The first question is for the general director. Vladimir Petrovich, insofar as more than three years have passed since our last meeting, could you briefly remind our readers of the principal advantages of the new transportation system realized in practice by Interlikhter?

V. Ushakov: Gladly. The more so as the experience accumulated by us, I feel, will be useful in fulfilling the indications of increasing shipping volume on LASH ships that are contained in the Fundamental Areas of Economic and Social Development of the USSR for 1986-90 and for the Period to the Year 2000, which were adopted at the 27th CPSU Congress.

First and foremost, the advantages of the LASH-ship system are manifested in its greater traffic capacity, which makes it possible, in the shortest of time periods and full preservation, to deliver cargo from river ports through the sea and ocean to maritime or river ports.

Proceeding from the requirements of the foreign-trade or transportation organizations of the countries along the Danube, Interlikhter organized the shipping of cargo on two routes.

Since December of 1978, a line has been in operation between the Danube river ports and the maritime ports of Bombay (India) and Karachi (Pakistan). The length of its river section is 2,416 km [kilometers], and its ocean section is 4,310 miles.

Another line has operated since April of 1980. It unites the Danube river ports with the ports of Vietnam and Kampuchea on the Mekong, with calls at Saigon (Vietnam) and Penang (Malaysia). The length of the route along the rivers is 2,896 km, and at sea it is 6,760 miles.

A round trip by LASH ship on the Danube--India/Pakistan line takes a total of 33 days, and 45.5 days on the Danube--Mekong--Malaysia line. LASH-ship anchoring time in ports for cargo operations does not exceed 3-4 days.

Editors: One need no be a specialist to evaluate these impressive numbers, unachievable with other shipping systems.

V. Ushakov: Yes, you are right. But that does not exhaust the advantages of the LASH-ship system.

Compared to traditional transport systems (railroad--maritime loading port--maritime vessel--maritime unloading port), LASH shipping has allowed charterers to be free of the expenses associated with transshipment, payment for cargo storage, its delivery by other means of transportation, and payments for various taxes and tariffs. The firm Interlikhter tariffs include freight charges for the river and maritime portions of shipping. Furthermore, the LASH ships operate according to a strict schedule which is announced in advance by Interlikhter to all interested firms and organizations. As a result, the shipper and recipient have the opportunity to know precisely the time the cargo will arrive. But that is still not all.

Insofar as cargo operations are conducted right at the berths of recipients and shippers (according to the "door-to-door" principle), the preservation of cargo is increased greatly, which is especially important in the delivery of valuable and small-lot cargo. And finally, the last advantage is that the cargo owners, expecting the arrival of a LASH ship and having on hand a free lighter, can use it for accumulating cargo without expenses for leasing warehouse accommodations.

Editors: You spoke of the advantages of the LASH-ship system for cargo shippers and recipients. What about the shipping economics for Interlikhter itself? How much, what kind and whose cargo has it shipped over the course of its existence?

G. Kolimar: My colleagues Vladimir Ushakov and Jan Ganusek have worked at Interlikhter since its founding, while I was assigned here comparatively recently. But we have already summed up the preliminary work results for the enterprise, including 1985, and they look impressive. From December of 1978 through December of 1985, the LASH ships Julius Fuchik and Tibor Samueli, which we lease in the Soviet Danube Shipping Company, completed 108 trips and shipped more than 2.6 million tons of cargo in direct and return directions, including more than 1 million tons of shipping between the Danube river ports and the Mekong. You know that since 1981 Interlikhter, besides cargo in lighters, has also shipped cargo in standard 20-foot containers. By the end of 1985, more than 9,500 of them had been shipped.

Approximately 47 percent of all cargo shipped was Soviet foreign-trade commodities. Some 13.5 percent was from Bulgaria and Czechoslovakia and 15 percent from Hungary. The cargo shipped by other firms along the Danube totals a little more than 11 percent.

The export of commodities from the Danube ports occupies approximately 70 percent of all cargo shipping, and imports approximately 30 percent. Of course, this imbalance requires the expansion of the cargo base and the further improvement of work on attracting cargo in the ports of the Far East region.

From income from freight charges, Interlikhter pays all operating and other expenses associated with shipping cargo in lighters and containers, carries

out the repair of the transportation equipment belonging to it and makes regular deductions for the leasing of LASH ships and services rendered to the enterprise by the Danube shipping companies of various countries for tug service and LASH-ship maintenance on the Danube.

Consistently positive financial results have created funds for normal activities and the development of the enterprise (capital construction, technical re-equipping, cultural and welfare needs, bonuses), as well as a reserve fund. Taking into account the significance and efficiency of LASH shipping for the foreign trade of the socialist countries and enterprise participants along the Danube, the Interlikhter Council adopted a resolution concerning the further development of the material and technical base of the enterprise based on the profits it obtained over the 1979-85 period. In particular, we are taking part in financing the construction of a LASH-ship repair yard being conducted by the Soviet Danube Shipping Company not far from the base port of Ust-Dunaysk. We propose to make capital investments in equipment for a number of ports on the Danube and Mekong, and possibly in India as well, which will facilitate an increase in the traffic capacity of the LASH-ship system and, according to our calculations, will rapidly justify themselves.

As you know, 1985 was very difficult for all Danube shipping companies. Navigation was halted on the Danube for a long period due to ice conditions and low water. This, of course, made lighter shipping more difficult as well. The powerful Interlikhter technical base and the precise organization of the operations of all of its links, however, allowed us to not only maintain the previous level but, moreover, achieve the highest shipping volume of the entire operating period of the enterprise. All of this speaks of the great opportunities and reserves in the LASH-ship system. This is acknowledged by both our partners and our competitors. According to preliminary data, the fulfillment of the financial plan for 1985 will look good. As always, we do not make use of credit.

**Editors:** At the beginning of the 1980s, the principal shortcoming of the LASH-ship system was irregularity in the presentation of cargo by shippers from trip to trip. Aside from the instability of the foreign-trade market, the reasons for this were shortcomings in commercial work and in the use of the LASH-ship system by the foreign-trade and charter organizations of the participating countries to the agreement. A precise schedule for LASH-ship departures did not exist at that time. How are things today?

**J. Ganusek:** At the time of your visit to Interlikhter in 1982, I spoke of what had been undertaken for the creation of precise LASH-ship operations. Today there are practically no violations of the schedule. As has already been stated, the LASH-ships out of the Indian and Pakistani ports are not at full capacity. We feel, however, that there are still unutilized reserves in the return direction, and are now working on expanding the cargo base in Southeast Asia. Under the conditions of Vietnam and Kampuchea, the possibility of off-loading LASH ships with export cargo (especially with fertilizer) in the lightly equipped river ports of the Mekong and even right at the recipient's in agricultural regions has particular significance. The

transportation and foreign-trade organizations of these countries have demonstrated great interest in the development of lighter and container shipping with the aid of Interlikhter.

In the last 3 years, we have turned much attention toward increasing the quality of commercial operations and reducing waste in shipping and losses from poor cargo preservation.

Editors: And how about the interrelationships with the commercial services of the participating shipping company enterprises?

J. Ganusek: We reviewed and specified the conditions of interrelationship with them and concluded new agreements in which the amounts of transportation service and their cost were clearly stipulated. The formulation of cargo documentation for export cargo was improved and the monitoring of the technical state of lighters was strengthened, which made instances of water damage to cargo very rare. We were also able to increase the cargo capacity of lighters through improving the stowing of such cargo as rubber, urea, paper, oil-cakes, polyethylene and others. A large saving was produced by shipping mineral cargo in containers that almost completely eliminated losses from poor preservation. The results of these measures were not slow to be felt. Over the last 2 years alone, thanks to the purposeful work of the specialists of the Interlikhter apparatus and the commercial services of the participating shipping companies and the agent companies, the total losses from poor cargo preservation decreased by more than 12 times.

Editors: What other forms of contact with the participating shipping companies of the enterprise were utilized for increasing the work quality of the LASH-ship system?

J. Ganusek: The development of international socialist competition among all participants in the lighter system plays a large role in improving the quality of shipping. Thus, an agreement on socialist competition was concluded among Interlikhter and the collectives of the Soviet Danube and Czechoslovak Danube shipping companies, in which the specific aims and tasks for the three competing collectives were defined. We have still not summed up the final results of the competition over last year, but it can be said that the competition had a great effect on the work of the competing collectives. The conditions for competition in 1986 are now being discussed in the collectives, and the exchange of experience and proposals directed toward eliminating existing shortcomings is being expanded.

Editors: The successes of the enterprise are apparent. But what still bothers you?

J. Ganusek: It would be incorrect to say that all is well here and that there are no unutilized reserves. In the majority of the Danube ports, specialized organizations have still not been created which could be occupied with cargo monitoring and accounting for spaces in the loading and unloading of lighters. The quality of securing operations (in accordance with the requirements of good maritime practice) is poorly monitored. Time is often lost due to all sorts of formalisms or delays in the formulation of documents.

A lighter does not have a permanent crew, and therefore it is maintained in ports by temporary duty crews. Unfortunately, our agents monitor their activity poorly, which often leads to violations of technological processes and to losses. We have many unpleasantries with regard to violations of contract conditions by cargo shippers for the delivery times of cargo to port and for the quality of cargo documentation. It seems that improvements in commercial and expediting work would be facilitated by the creation of our own computer-information center.

Interlikhter is constantly strengthening business contacts in its activity and cooperates closely on a mutually beneficial basis with all Danube shipping companies, making use of them for towing services, fleet repair, maintenance and lighter handling in port. We give our shipping partners a large volume of work. Over the period of Interlikhter operation on the Danube, more than 6,000 line tows of lighters belonging to the enterprise were carried out, more than 330,000 tons of cargo were shipped on barges chartered by us, and approximately 2.5 million tons of cargo were handled in the Danube ports (with payment for all of these services according to the conditions of the Bratislava Agreements).

Many firms of the FRG and Austria understood the commercial expediency of using the lighter system for delivering their commodities and receiving import cargo. Since the creation of Interlikhter, approximately 110,000 tons of various import and export cargo have been shipped for them. Interlikhter has long-term business contacts with various foreign-trade, broker, charter and service organizations of the FRG and Austria. It cooperates regularly with the Danube shipping companies of these countries--the DDSG and Bavarian Lloyd. A trend toward increasing volumes of cargo presented by West German shippers has been noted. Thus, 12,200 tons were shipped in 1984, while 10,500 tons of such cargo were shipped in the first 9 months of 1985 alone. The amount of Interlikhter services to Western firms in 1985 considerably exceeded that of the preceding year.

Editors: It is recalled that in 1982 it was mentioned that some shipping enterprises of the capitalist countries on the Danube had a guarded (and some a hostile) attitude toward the first steps of Interlikhter in setting up regular shipping with the countries of Southeast Asia. The data cited by you indicate that the situation is changing. What is the "secret" of the change in attitude of some Western companies and organizations toward the activity of Interlikhter?

J. Ganusek: There is no secret here of any kind, but there is an economic basis.

The activity of Interlikhter facilitated an increase in new traffic flow to the Danube ports, which in its turn aided the development of the fleet and ports of the Danube shipping companies of all countries and the expansion of berth, warehouse and container-terminal capacities. Since 1984, Interlikhter container shipping on the Danube has grown quickly, which has continued into 1985. This not only produced profits for our business partners, but also provided work for thousands of people. It must also be emphasized that

in its activity, Interlikhter strictly adheres to all of the tenets of the Bratislava Agreements and the resolutions adopted at the conferences of the directors of Danube shipping companies.

Editors: Thus, can it be considered that the activity of Interlikhter has obtained international recognition?

G. Kolimar: Undoubtedly. We constantly participate in the conferences of the Danube shipping companies--forums for the ship owners of all the countries along the Danube--and strive to fulfill the recommendations of these conferences. Our delegation was recently invited to the International Conference on the Mekong, where it was noted that thanks to the LASH-ship system, a reliable regular transport link between the countries along the Danube and the countries of Southeast Asia has been established.

Editors: We understand that the LASH-ship system is more efficient when its maritime portion begins and ends at the estuaries of large rivers. The experience of shipping from the Danube to the Mekong testifies to this. Do you have prospects for expanding lighter shipping to other river basins?

V. Ushakov: Not quite so. We have already noted that one of the chief advantages of the LASH-ship system is the delivery of cargo to shallow-water ports, both maritime and river ports, without transshipment and right in the areas of the demand for the commodities. Of course, estuary ports are the most suitable for this. In cases where the cargo shippers and cargo recipients are located at river ports, and the departure and arrival ports of the LASH ship are in river estuaries, this has the greatest effect.

Prospects for such shipping exist. In the 1985 shipping season, we, in conjunction with the river workers of the Soviet Ukraine, organized the experimental delivery of imported natural rubber in lighters from Vietnam and Kampuchea to the Soviet river ports of Dnepropetrovsk and Kiev without transshipment. Some 12,000 tons of rubber was shipped in 19 lighters.

The lighters with the rubber were delivered on LASH ships to the base port of Ust-Dunaysk, whence they went by small LASH vessels of the Soviet Danube Shipping Company or simply by ocean-going tug to the port of Kherson and from there were towed by Kiev tugs up the Dnepr. From the berths of the Dnepropetrovsk River Port the rubber was delivered by truck right to the warehouses of the Dnepropetrovsk Tire Plant.

This experiment once again demonstrated the enormous efficiency of the lighter system. The delivery of 12,000 tons of rubber from the maritime ports of Ilichevsk or Izmail would have required more than 300 railroad boxcars, as well as considerable labor expenditures for unloading the rubber from the vessels (or LASH ships) and loading it into the railcars. Furthermore, ordinary shipping on the ship--railcar scheme takes 60 days, while the experimental lighter runs with rubber allowed its delivery from supplier to consumer in 25-30 days with full preservation.

Editors: Now a question for the chief engineer of Interlikhter. What problems in maintenance were resolved by the enterprise in recent years and what problems are still awaiting their turn?

Kh. Khristov: The maintenance of the LASH ships and lighters improved considerably with the completion of the construction of the deep-water Ust-Dunaysk base port.

The problem of lighter repair, however, will be finally solved after the creation of a special yard near the base port in conjunction with the Soviet Danube Shipping Company. The enterprise now owns 200 lighters of the Danube-ocean type and 1,300 20-foot international-standard containers. We are not only concerned with the maintenance of our own equipment in good technical condition, but are constantly thinking about improving it.

As you recall, several years ago the LASH-ships Yulius Fuchik and Tibor Samuely could take only 26 lighters, each of which had up to 1,100 tons of cargo. We have developed a system for placing and securing 20- and 40-foot containers on the roofs of 10 lighters, which has considerably increased the cargo capacity of the LASH ships and has produced a substantial economic saving. Then, by way of a simple outfitting of the second deck of both LASH ships, we were able to accommodate an additional 2 small-size (LEShtype) lighters on them for each run.

The LASH ships sail in regions where they often encounter powerful storms and sometimes even typhoons. Water falling onto the roofs of the lighters penetrated into the holds and ruined the cargo. This occurred due to imperfections in the hatch covers. By slightly increasing the height of the upturn of the weld joint of the covers, we fully eliminated instances of cargo wetting.

Lighters often receive considerable body damage that does not affect the safety of sailing during towing, mooring and cargo-handling operations. The Regulations of the Register of the USSR are identical, however, on these issues both for ocean-going liners and small lighters. Many lighters, fully suitable for operation, had to be sent for repair in order to correct various types of dents. This, of course, led to considerable expenditures and losses of operating time. On our initiative, special norms were developed for permissible wear and tear and body deformations of lighters which allowed a sharp reduction in the amount of body work (without a loss of lighter reliability) in regular examinations.

Here is yet another example that shows how the organization of maintenance can have an effect on the operating results of the enterprise. The lighters are on board the LASH ships for almost one third of their operational time, when their bodies can be examined carefully and many parts can be repaired. In 1985, two experimental LASH-ship runs were organized on which special repair teams were sent. They carried out lighter maintenance and prepared them for examination by the USSR Register of Shipping without their removal from operation. Variants for conducting lighter maintenance in handling ports and while they are awaiting loading operations are currently being worked out.

The possibility of equipping additional cabins and workshops for the unit repair of machinery on LASH ships is being researched. Our enterprise is taking on the expenses for maintaining the repair team, as well as for creating additional cabins and workshops.

Editors: To what extent will the completion of the construction of the Rhine--Main--Danube Canal have an effect on the activity of Interlikhter?

V. Ushakov: At the creation of the enterprise in 1978, we did not take into account the possibility of shipping on the new canal, which will enter service in 1992, in our economic calculations. The enterprise Council also did not consider this issue. As for my own opinion, I have no great illusions with regard to expanding shipping in Danube--ocean cargo traffic after the introduction of the new canal. A stable cargo base has already taken shape for us in the countries along the Danube, providing LASH-ship loading for export. If the opportunity arises and it is economically expedient to accept cargo coming from the Rhine and Main in LESh-type lighters, however, then of course Interlikhter and its Council will consider such prospects. We already have quite solid contacts with firms and organizations of the FRG and Austria. If our partners demonstrate interest in including cargo from the northern regions of Central Europe in the Danube LASH-ship system, then we undoubtedly will try not to disappoint them. But this is all in the future....

In concluding our discussion, I would like to note that the experience of the activity of the first international enterprise in CEMA transportation, Interlikhter, operating with full economic accountability, confirms the efficiency of versatile economic enterprises and the promise and mutual advantage of such forms of cooperation among socialist countries. The practical activity of Interlikhter aids the expansion of integrated processes in the sphere of transportation in the socialist countries.

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## INTERSECTOR NETWORK DEVELOPMENT

### GOSPLAN OFFICIAL ON TRANSPORT SECTOR DEVELOPMENT STRATEGY

Moscow ZHELEZNODOROZHNYY TRANSPORT in Russian No 4, Apr 86 pp 32-37

[Article by D. K. Zotov, chief of USSR Gosplan Transport Department: "Improve the Effectiveness of the Transport Conveyer"]

#### [Excerpt] Ways of Comprehensive Development and Interworking

The scope of tasks to increase shipment volumes and improve the quality of transport services is truly grandiose. In order to fully satisfy the needs of the country's economy and population it is necessary not to carry out individual measures by types of transport, but to develop and adopt a unified system, a set of activities aimed at raising the quality of shipments, perfecting the commercial and legal relationships of transport and consigners, and improving the coordination among different types of transport.

Shipment volumes and traffic intensity on Soviet railroads surprise foreign specialists. Our rail network, which comprises approximately 11 percent of the total operating length of railroads of world countries, fulfills over 53 percent of the overall freight turnover and almost 25 percent of the passenger turnover of all main rail lines. The freight intensity of our railroads is 5-6 times higher than in the United States, railcars are used three times more productively, and locomotives 1.5-2 times more productively.

It was of course no simple matter to achieve such a high level of intensification of transport capacities. At the same time, however, the high freight intensity and low net cost of rail shipments sometimes turn into a violation of demands on the quality of transport services of sectors of the national economy and into just censure on the part of freight consigners and consignees. Railroads experience a chronic overload, while there are significant unused reserves in truck and water transport. The design speeds of locomotives and railcars are increasing but the freight delivery rate remains low. According to calculations of VNIIZhT [All-Union Scientific Research Institute of Railway Transportation], on approximately half of the length of the railway network use of throughput capacity exceeds the rational level, and it is used practically fully on 14 percent of the length. Under these conditions failures of technical equipment often arise which lead to disruptions in traffic, a periodic oversaturation of the railcar park on some

special-purpose tracks [poligony] of the network and of routes [napravleniye], disruption of the normal rhythm of train traffic, and a drop in speed and regularity of freight and passenger delivery.

The growth in intensity of shipments and the strengthening of interworking of rail transport elements among themselves and with other types of transport make the task of comprehensive development of the transport sector based on a systems approach especially urgent. A decisive transition to comprehensive use and development of different types of transport and to a corresponding new content and new terms of work represents a first and necessary condition for effectiveness of the entire transport system in the present situation.

It stands to reason that none of the specialists deny the need for a comprehensive approach to development and organization of transport operation, but are we always able to essentially resolve a particular transport problem comprehensively? Are we always capable of examining a particular design-planning solution in the transport area from the standpoint of comprehensiveness and in the interests of persons in related fields and the national economy as a whole? We will say frankly that in sometimes being carried away by an optimization of individual processes and operations we forget that, in contrast to other techniques of economic analysis (to a certain extent justified, of course), the systems approach advances to the fore the principle of comprehensiveness and consideration of the interworking of types of transport with other sectors of the national economy and among themselves.

It will be no exaggeration to state that the 12th and subsequent five-year plans for transport should become a period of final development of scientific concepts and immediate adoption of the idea of forming a national unified transport system (YeTS). It is common knowledge that work in this area has been going on since the mid-1950's. The time has come for purposeful completion of the work and practical implementation of the results of a number of previous studies. The fact is that comprehensiveness and the overcoming of narrowly bureaucratic trends permits identifying and placing the enormous and as yet unused reserves at the service of the national economy, and seeing more clearly the alternative solutions and paths of harmonious development of the transport system as a whole. Herein lies the basic content and principal practical value of integration. The unified transport system being formed must represent a synthesis of existing types of common carriers and guarantee high quality of transport services for the country's economy and population in all kinds of shipments.

Formation of a highly effective national unified transport system is a large and difficult task. Its accomplishment required joint efforts and purposeful, coordinated activity by scientific and skilled workers of the system of Gosplan and Gossnab USSR, the USSR Academy of Sciences, GKNT [State Committee for Science and Technology], and the transportation departments. Acceleration of freight delivery and passenger movement based on achievements of scientific-technical progress and adoption of flexible technologies and more improved transport schemes requires further efforts to coordinate the work of different types of transport. Meanwhile, the capabilities for combination use of different types of transport are not always being fully realized. As a

result freight shipments in direct mixed rail-water connections are dropping and their national economic importance is diminishing. The fact is that not one type of transport including rail cannot operate in isolation from related areas whether it be truck transport, the maritime and river fleets, or industrial transport. Underestimation of mixed shipments is nothing more than one of the most obvious manifestations of narrowly bureaucratic economic practice.

Many years ago the Institute of Complex Transportation Problems began developing a unified system of transport-wide indicators. The system is intended to stimulate achievement of the highest production results in all types of transport and promote a rational distribution of shipments among them and more precise coordination of the work of the entire transportation complex. This most important problem demands special attention and most rapid resolution. What has been said relates equally to the development of a unified system of accounting and planning for transportation expenditures taking in enterprises of both common carrier and departmental transport for the purpose of increasing the economic incentive to cut costs of shipments at each enterprise and construction site and in every element of the national economy.

An improvement in quality of the country's transport services based on the national unified transport system will require assurance of guaranteed delivery by a given time of a number of categories of small-lot supply freight and shipments under subcontracting arrangements with the participation of several types of transport. The question is posed about a revision of tariffs on freight shipments with a differentiation of freight payments based on freight delivery quality levels. The need for adjustment (basically in the direction of an increase) and greater differentiation of tariffs stems from the requirement for self-repayment of transport enterprises and assurance of expanded reproduction in the transport sphere on its own economic basis.

A differentiation of tariffs by the quality levels of transport services must take full account of the need for a transition to progressive, resource-saving methods of performing loading-unloading operations precluding repeated transshipments and the losses caused by them, and a need to assure direct delivery of freight to production sectors. This will also be facilitated by transshipment of freight in sea and river ports primarily by the direct variant (bypassing the warehousing) based on broad introduction of a unified operating technology of ports and stations and of industrial and mainline transport, and introduction of economically substantiated layover norms of rolling stock of different types of transport and of containers on spur tracks and in ports. The system of transport-dispatch services to the population needs further improvement.

The following basic directions of the work can be singled out in improving the interworking of transport organizations with serviced enterprises and among different types of transport:

--Assurance of optimal development, from a national economic standpoint, of enterprises' transport-warehouse resources with consideration of the product output plan and planned development of production, as well as an improvement

in the quality of transport services; establishment of mandatory state norms for development of enterprises' transport-warehouse resources and processing time of common carrier rolling stock;

--Concentration of freight operation carried out on spur tracks and of the locomotive park and other technical equipment servicing them in large transport associations and enterprises, and concentration of a considerable portion of the spur tracks which do not have large internal industrial shipments in the MPS [Ministry of Railways] system; concentration, within various limits, of departmental transport with the resolution of corresponding legal and economic issues of the interworking of freight owners and railways. General development schemes of industrial railway transport of the country's main industrial areas must be implemented;

--Organization at railway stations of bases in the common carrier truck transport system for unloading and subsequent delivery of bulk freight to consignees who do not have spur tracks;

--Introduction of a coordinated work technology of consigners, transport organizations, and consignees on routes of mass flows of freight transported in mixed connections through sea and river ports, with the use and further perfection of foremost experience in the continuous planning of work by all participants in the transportation process;

--Expansion of the practice of cooperative use of the freight management physical facility of interworking types of transport.

The importance of perfecting legal relationships of types of transport among themselves and with sectors of the national economy should be emphasized in particular. The development and introduction of unified principles of transport legislation will require corrections to be made to sectorial regulations, codes and shipping rules. An organized and effective transport system cannot be isolated from other sectors of the national economy, and this requires developing a tool for monitoring and balancing the production and shipment of freight by common carrier. This will result in an important step being taken to assure the firm organizational-management, information, technical and legal unity of all types of transport.

A factor such as the ever increasing mutual penetration of types of transport also should be considered to the full extent. Development of containerized shipments, transporting of railcars and motor vehicles on seagoing ferries, and other methods of a combination use of rolling stock lead to close technological contact and an interweaving of the carrying resources of different types of transport. This fundamentally new factor in development of the unified transport system indicates the need for a substantial improvement in the quality with which the transport process is controlled on the basis of a more advanced system for mutually coordinated planning of the work of all types of transport and on the basis of control over progress in fulfilling these plans.

The country's transport has advanced considerably over the last 10-15 years in developing containerized shipments. The results provide grounds to believe

that the course toward containerization is fully justifying itself. The transporting of valuable freight in containers is developing and taking in all types of transport. The packaged transport of timber, rolled metals and packaged-unit freight is becoming widespread. Containerized and packaged shipments serve as a vivid example of the effectiveness of new resource-conserving technologies: every ton of freight carried in containers provides an average saving in national economic expenses of 20-22 rubles, and every ton carried in packages saves an average of 4-5 rubles.

So-called transport-technological systems (TTS) are being established at the initiative of and with the leading role played by marine transport workers. In these systems modern means of freight delivery--containers, packages, railway ferries, lighter-carriers and so on--are combined in the most rational manner according to previously developed and mutually coordinated schemes. Shipment in "consolidated lots" provides a saving of metal consumption for containers and for fastening freight of 2,000 tons and a saving of lumber of 100,000 cubic meters for every million tons of freight. The layover of railcars for loading and unloading operations is cut in half, that of seagoing and river vessels is reduced by 8-10 times, and that of trucks by 5-6 times. From 800 to 1,500 workers are freed from heavy manual labor. There is a reduced need for the extent of freight fronts--rail lines, berths in sea and river ports--and an improvement in the use of freight transfer machines and mechanisms. It has been calculated, for example, that proportionate [udelnyye] capital investments for constructing berths are reduced 2.2 times in shipping timber cargoes in packaged form with transloading at sea and river ports. The adoption of transport-technological systems is not only of great economic importance, but of great social importance as well.

More active participation of freight consignees and consigners is required in creating a network of container points and expanding the park of specialized containers in order to achieve the planned scope of containerized and packaged shipments in all types of transport and to introduce means of containerization and packaging to the work technology of product suppliers and consumers. The technology of industrial and agricultural production must be developed with consideration of maximum possible containerization and packaging of the products to be shipped. Implementation of state and sectorial standards for technical means of containerized and packaged shipments, consolidated freight units, and freight delivery processes will assure unity of actions in resolving this important transport-wide and national economic problem.

The improvement of passenger movements on all types of transport is an inalienable component of social measures for bettering the Soviet people's material and cultural standard of living. In accordance with the CPSU Central Committee and USSR Council of Ministers decree "Further Improvement of Transport Work for Serving Passengers," the principal task should be considered to be complete, quality satisfaction of the needs of the country's population for transportation in long-distance, local, and suburban common carrier connections. To save time and substantially improve the quality of population services, it is necessary above all to ensure that traffic dimensions conform to the actual passenger flow, to increase traffic speed on all types of transport, to increase the regularity and level of comfort with

consideration of the nature and distance of the trip and passenger needs, and to reduce passenger costs at points of transfer from one type of transport to another.

The first section of the automation system for accounting for and distributing seats in Ekspress-2 trains recently placed in operation at the Moscow terminal is an example of new technology in the area of passenger movements based on use of computers. Electronics came to the help of passenger service personnel of Moscow train stations back in 1972. The Ekspress-2 system has been considerably improved in comparison with its predecessor: it is more versatile and productive, and new-generation domestic computers have been used in it. The number of ticket booths included in the system has increased from 600 to 1,000 and the number of queries processed in a 24-hour period increased from 200,000 to 1.5 million. While the previous system satisfied requests for two days in advance, now the spectrum of automatic equipment operation has expanded to 45 days. The use of computers is an effective method for eliminating lines at ticket booths in all nine capital stations even in the most intensive time of summer transportation.

Implementation of the course planned by the party for intensification of the economy requires transport workers to mobilize internal reserves, to make complete and effective use of existing capacities, and to achieve high end results with least input. It is impossible to accomplish these tasks without a further improvement of planning and management at all levels of the multisector transport management and without an improvement in transport's interworking with consigners and consignees in drawing up and fulfilling national economic shipment and delivery plans.

Implementation of the CPSU Central Committee and USSR Council of Ministers decree "Improving the Planning and Organization of Transport of National Economic Freight and Passengers and Strengthening the Influence of the Economic Mechanism on an Increase in Effectiveness of the Work of Transport Enterprises and Organizations" holds an important place in this work. Standardization of many indicators and economic norms for all types of transport, transition to planning the overall volume of freight transport (shipments) in tons as a directive indicator in place of ton-kilometers, and improvement in economic accounting at all management levels provided by this decree create preconditions for the comprehensive planning of shipments coordinated by types of transport and for more effective use of available production capacities. The work which has been started must be continued in a direction assuring a closer tie-in and balance of plans for production, transport, supply, and sales.

The specific nature of transport is such that efforts are required not only of transport ministries and departments, but also of other ministries and departments for effective use of its carrying potential. The transport plan is law for us and we are obligated to fulfill it completely and on time. At the same time, there is a significant volume (according to tentative calculations, up to 2-3 percent of the freight turnover) of cross, excessively long, repetitive, and other hauls being accomplished in transport which are

categorized as irrational. The basic reasons for such excessive haulage of products are deficiencies in placement of individual production facilities and the imperfection of current planning of supply, sales and transport.

We should strive to eliminate irrational shipments and as a result to reduce transport costs by hundreds of millions of rubles annually by optimizing schemes of freight flows and the disposition of productive forces, enrichment of many kinds of raw materials and fuel, expansion of direct "supplier-consumer" ties, and improvement of the economic mechanism.

The economic experiment now being conducted in transport as in other sectors of the national economy will promote further development and improvement in the effectiveness of cost accounting. A consistent transition to full cost accounting with a strengthening of economic factors opens up horizons for the initiative and creativeness of labor collectives while at the same time requiring essential changes to be made to the system of existing economic indicators of transport operation and existing norms.

The transport management system also needs improvement on a national scale. The situation in transport dictates the need for improving the system and methods of control of all its elements, for optimal distribution of shipments by types of transport, and for organization and effective coordination at transport interchanges. Questions of transport management are the focus of attention of the CPSU Central Committee and of republic, kray, oblast and city party organizations. The work of transport organizations is analyzed at plenums and sessions of party committees. It is commonly known that a number of valuable initiatives of foremost collectives of railroaders, seamen, river transport workers, truckers, and industrial transport workers were approved by CPSU Central Committee and USSR Council of Ministers decrees.

Having become the common property of the country's transport workers, the experience of these collectives now serves as a practical tool for efficient management of the shipping process in transport centers. At the same time, it also is of primary importance as a unique laboratory in which the best management variants are identified and selected. Adoption of foremost methods and techniques of management work, particularly systems for continuous planning of transport center operations (NPGRTU), is not being done without difficulties. There still are many obstacles in the path of this important work which have to be overcome.

The transport resources of a number of transshipment centers--sea and river ports--need strengthening. There are not enough station tracks here and existing tracks do not accommodate the heavy-freight unit trains; and the latest automatic, signals and communications devices are being used little. In port centers there is an odd and unnatural combination of satellite communications aboard ships and signal horns on railroad tracks, semiconductor apparatus of shipboard automatic equipment and manual switches, port computers and the classification of railcars on shunting lines by obsolete methods. For this reason much time is spent delivering railcars to berths and warehouses, and this not only makes transhipment more expensive, but also holds up the growth in freight flows, leads to lengthy layovers of expensive merchant and river vessels, and causes additional enormous expenditures measured in

millions of rubles which "eat away" at an appreciable part of currency proceeds in shipments of export-import freight. Elimination of disproportions in production capacities of merchant and river transport on the one hand and rail transport on the other is one of the principal conditions for improving the effectiveness of direct mixed rail-water shipments and for making transshipment cheaper and faster.

In recent years the Ministry of Railways has developed a program of measures to develop railway resources of seaports for 1986-1990 and is beginning to implement it. This approach to matters can only be welcomed. These measures include an improvement in schemes for making seaports contiguous with the railroad network, an increase in capacity and length of port station tracks, construction of gravity classification yards, and outfitting of port stations and yards with electric centralization of switches and signals. The planned work will increase the transshipping potential of our ports.

Effective use of production capacities in truck and river transport which are managed not on a union but on a republic level is hampered. The state puts billions of rubles into development of the road transport complex, but these capital investments are insufficiently effective inasmuch as they are dissipated to many motor transport ministries and departments, each of which accomplishes its own departmental tasks with little concern for forming a unified and highly effective transport system on a national level.

In the union republics the motor transport complex, which operates vehicles and constructs and maintains highways, was under the auspices of tens of different ministries and departments. In the RSFSR for example these matters are handled by the republic's Ministry of Motor Transport (through oblast transport and territorial associations), the Ministry of Highway Construction and Maintenance (through oblast road administrations), as well as many other ministries and departments having their own motor transport. A similar situation took shape in the other union republics as well. The road component is not considered in motor transport expenditures inasmuch as the road management now is formed from state budget appropriations, deductions from the incomes of motor transport enterprises, and the means and resources of other sectors of the national economy which are used.

A similar situation exists in the country's river transport. Administration is dissipated to union republics and as a result the fleet of several transport departments operates on the Dnieper, Irtysh, Neman and other river mainlines, oftentimes duplicating each other. Each republic and each basin built their own vessels, ports, and hydraulic works of different types and established their own ship repair facility, which is prejudicial to a unified technical policy in the field of transport; does not fully use the throughput capacity of the transport fleet; and decreases economic effectiveness of allocated capital investments.

The growth in scope of activity of motor and river transport and the quality improvements in operating conditions of vehicles and the river transport fleet, which are playing an ever increasing part in inter-republic and inter-rayon transport-economic ties, require a reorganization of management of these

types of transport above all and establishment of ministries at the national level: a union ministry for control of river transport and a union-republic ministry for control of the road transport complex.

Management quality in all types of transport can be substantially improved if the selective measures of a planning and management nature being taken in different types of transport are mutually coordinated and tied in by time and territory as a group of homogeneous subsectors within the framework of an overall general management scheme of transport. Here it will be necessary to substantiate preferential types of transport associations (including general transport centers), optimal organizational structures and methods of coordinated management of different types of transport.

Full use must be made of the achievements of scientific-technical progress in the field of computers and ASU [management automation systems] in this difficult work. The transition to an integrated transport management automation system (ASUT) on a unified methodological basis has been prepared naturally by all the experience of the almost 20 years of development of transport sector ASU. Unfortunately, however, there is to this date no such unity in the sectorial ASU being developed. Meanwhile, it is needed both for the choice of technical equipment and for building computer networks which must ensure the effective and faultless action of the entire national transport complex management automation system.

The principal problems for use of ASU in transport remain the following:

- An improvement in efficient management of the shipping process on the basis of wide use of automated information-reference and conversational systems and dynamic models;
- Automated management of the work of classification yards and freight stations, sea and river ports, airports, motor transport enterprises, repair plants and so on;
- Introduction of new and improvement of existing automated systems for ticket distribution and sale for trains, aircraft, sea and river vessels, and buses on long-distance and local connections;
- Automation of the collection and processing of accounting data on loading, unloading, and transloading work;
- Automation of the planning and forecasting of transport flows;
- Creation and adoption of management automation systems for individual technological processes, particularly the movement of trains and vessels of the merchant and river fleet, and take-offs, landings and flights on civil aviation routes;
- Completion of work to create a planning calculations automation system (ASPRT).

The ASU of the types of transport must be mutually tied together within the framework of a transport-wide automation system, and a set of tasks must be accomplished to automate the management of mixed shipments and work at transport interchanges.

Special emphasis should be placed on matters of regulating transport's interrelationships with the natural environment in the development of transport as in the development of other sectors of the national economy. Ecologic characteristics and the degree of harmlessness of transport to man and the natural environment will have an ever greater influence on the choice of types of transport and types of technical equipment and technology of shipments, and consequently on the substantiation and adoption of planning-economic decisions in the transport area. Such characteristics include noise and vibration levels, the presence of harmful discharges into the atmosphere, the requirement for territory and so on. Ecologic factors may cause changes in views on the advantages and shortcomings of individual types of transport in the very near future.

The fact is that concern for environmental protection is a social-economic problem of the current and succeeding decades for all mankind and evidence of man's growing understanding of his vital link with the natural environment. The nature of engineering tasks in the field of transport equipment and economics, their statement, and methods of accomplishment should change substantially in the very near future in this regard. We can mention as an example the search for new transport systems having rolling stock which does not touch the track, creates no noise and has no harmful effects on the environment or man. Under conditions of scientific-technical progress the contemporary transport technology permits creating fundamentally new types of long-distance transport and especially suburban transport. Therefore the latest achievements of scientific and engineering thought must be fully considered in the technical and economic analysis of the future unified transport system.

The development of transport concepts defining the place of transport in the economic system and ways of including it in an international division of labor in a number of individual countries and in interstate associations is typical of the present period. This matter has special significance for the USSR as the central element in the system of economic integration of socialist countries. The search for and practical realization of measures for most effective use of transport resources within the framework of CEMA, and elimination of obstacles dependent on transport in the path of developing an interstate exchange and integration of transport of CEMA member countries in international shipments is simultaneously both an economic task and an important political task.

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## EXPERIMENTAL SYSTEMS

### ACADEMICIAN URGES COORDINATED AIRSHIP DEVELOPMENT EFFORT

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 7 Jun 86 p 2

[Article by special correspondent M. Kaganskiy: "Helistat, Thermoplane, and Others"]

[Text] Academician N. Cherskiy, deputy chairman of the USSR Supreme Soviet Standing Commission on Transportation and Communications, Hero of the Soviet Union, reflects on the causes impeding the development of fundamentally new types of transport.

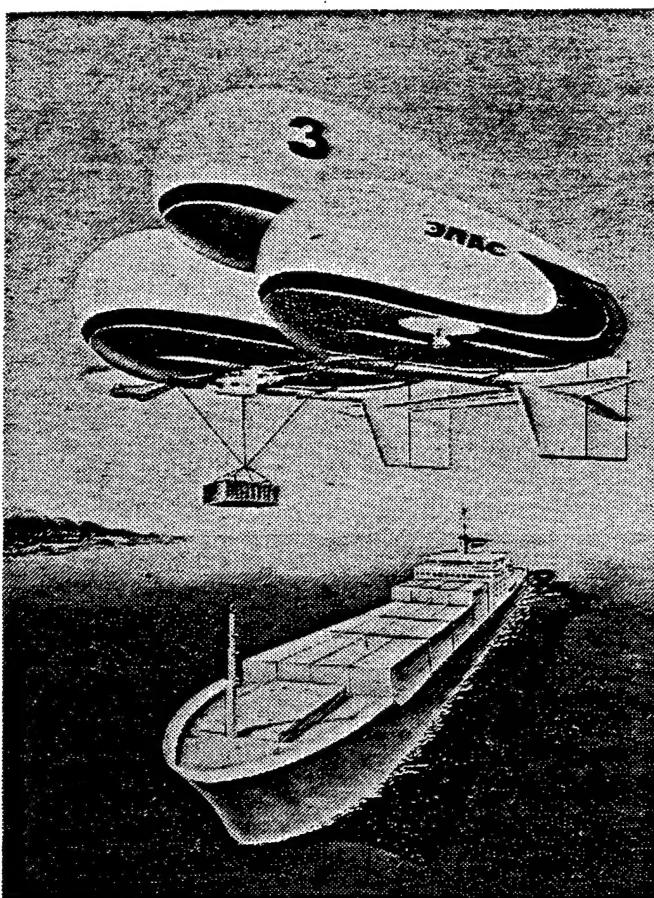
Imagine a gigantic lens-shaped shell approximately one and one-half kilometers long. Such a super-airship (its developers called it a thermoplane) with nuclear-powered engines and capable of transporting cargo weighing up to 10,000 tons carries as much freight as a heavily loaded railroad train. It carries out shuttle flights over inland routes without landing for months. The freight is conveyed to the thermoplane by special elevators.

Fantastic? Yes, but also quite real. The idea has been theoretically proven, scientifically, technically, and economically substantiated, and upheld by an expert examination.

Or how about this idea. Transporting gas in gigantic containers, holding 1 million cubic meters each, for example, filled with methane. Such a flying vehicle is lighter than air, transports itself and thousands of tons of freight, and supplies cities and villages with gas--like a receiver.

The helicopter is by far not the most efficient machine. By way of illustration, the MI-10 lifts 10 tons of cargo. But its net takeoff weight with this cargo is 42 tons. It turns out that the helicopter uses three-fourths of its power for delivering itself. But what if you combine it with an airship which compensates for the helicopter's weight? In this case, all of its power is used for delivery of the payload. Such a symbiosis is called a helistat. In prospect, it is capable of transporting freight weighing hundreds of tons.

I could continue this list further. I would only add that some of the ideas have been known for dozens of years already and have been approved by highly qualified experts.



I foresee a legitimate question: Why then have no practical steps been taken to introduce efficient flying vehicles?

The question is legitimate. There is no single answer to it. There are various reasons: the lack of the necessary technical base at that time; a shortage of experience; and the element of risk associated with this. But the main reason, perhaps, is the lack of a single center of control of scientific and technical progress in this field.

I will back up my statement and cite such an example. In the USSR Gosplan conference hall 5 years ago in October 1981, there was a demonstration of a working 6-meter one-tenth scale model of a so-called power flying vehicle for construction and assembly work. The hybrid of a two-story airship with an aircraft produced a great effect. Such transport-assembly vehicles can carry over solid, roadless taiga and tundra power transmission line supports, large-

sized assembled power-generating units, and building structures, haul multi-ton bundles of trees from mountainous and wooded areas, and deliver a wide variety of freight to areas inaccessible by other types of transport.

But maybe, as they say, it is not worth getting something at a cheap price, if additional costs make it expensive? Not at all. The economics are in favor of the new transport. Calculations have shown that the cost of delivering 1 ton of freight by the "8-ton carrier" is 10 kopecks per kilometer, and is 2 kopecks for the "200-ton carrier." For comparison, delivery of freight by helicopters is 10 times more expensive.

The innovation has opened up great prospects for using air transport for massive freight shipments. The developers initially planned to build a vehicle with a lifting capacity of 6-8 tons, then 30 tons, and 200 tons by 1985. But, alas, it did not come to this. It turned out there was no one to build it. Administrators of the "specialized" ministry--aviation industry--did their best to bury the idea of building the airships.

The position of the Ministry of the Aviation Industry is understandable. The ministry has intense plans, and here it has to find capacities for producing a novelty which may or may not go. Something else is not understandable. Assigning its fabrication to someone who has no objective interest in this is to ruin it in its inception.

Up to now, the new direction in air transport development has not been generally accepted. Separate groups of enthusiasts in a good 10 ministries are engaged in designing the proposed transports.

Developers today can offer industry designs quite ready for experimental study. There is no shortage of customers for such vehicles. Many sectors are willing to finance this work. By way of illustration, 6 years ago a special firm "Energoaerotrans" was organized in the USSR Ministry of Power and Electrification (an operating model built by this firm was demonstrated at the Gosplan). The then USSR Ministry of the Lumber Industry, which allocated people and resources, became involved in the work. The novelty underwent testing at plots of the Transbaykal Forest. The Ministry of Construction of Petroleum and Gas Industry Enterprises and the Ministry of the Gas Industry became interested.

Here is where the enthusiasts should have had support. But the decision was made to transfer the firm from the Ministry of Power and Electrification to the Ministry of the Aviation Industry. However, the transfer did not take place. The firm ceased to exist....

But the inventors continued to receive requests for developing these vehicles for the needs of various sectors. As an example, quite recently a letter came from organizations of the USSR Ministry of the Fish Industry. In short, the demand is there. But, as before, there is no manufacturer.

The builders of the airships today work in nonspecialized organizations and on a social basis. Nevertheless, they are not giving up their research. Professor O. Chembroskiy's group, for example, which is overseen by the

Ministry of Tractor and Agricultural Machine Building (!), has created an even more original novelty--the developers call it a "airship without a shell." Instead of light gases--hydrogen, helium--it uses the natural discharge of the air occurring in the enclosed eddy flow.

Inventors of the Kiev Public Design Bureau of Airship Building at the Special Design Office imeni O. K. Antonov, who are supervised by M. Ariye, A. Larin's group from the Central Institute of Aerohydrodynamics, designers from the Moscow Aviation Institute headed by Corresponding Member of the USSR National Academy of Sciences S. Yeger, and other enthusiasts have come up with interesting designs.

Enthusiasts working on transport-installation airships are ready to build prototypes with a lifting capacity of 8-10 tons in 1.5-2 years. Once again, however, people are saying it is unrealistic, that it is adventurism. I would remind them that at one time airships with a similar lifting capacity were built in less than 1 year. And this was with an underdeveloped, by today's standards, technical base.

Today's technical capabilities are much greater. Innovators have gained experience also. But we need a center which would combine the efforts of the separate groups of developers, place the work on a modern scientific and technical track, and could conduct purposeful experimental checking and development of the new vehicles. Such interbranch centers exist and are operating successfully. Suffice it to recall the Electric Welding Institute imeni Ye. O. Paton.

One must also mention the position of the State Committee for Science and Technology, which should be the organizer and guide of scientific and technical progress. But today it is not this at all, since the deciding word in implementing some or other scientific idea belongs to the sectors, and in a number of cases to the head departmental institutes which implement sector policy, often contrary to the national economic need. Quite a few good ideas become lost in the maze of endless coordination.

Back 12 years ago authoritative experts recognized the thermoplane, gaseous compositions, as well as helistats as promising directions. In 1982 there was a decision by the USSR Gosplan and State Committee for Science and Technology to manufacture two prototypes of a flying machine for construction and installation work, which was already mentioned. But all the decisions have been "blackballed" by various subsequent commissions in which the head institute of the Ministry of the Aviation Industry had the main voice.

While the opponents of airship building have been arguing the hopelessness of using such vehicles, research abroad has been going on at full speed. In the United States, for example, they have been building and testing large-scale models of rotational and other systems--helicostats, cyclo-cranes. A front of prospective work has become clearly visible in the field of airship building on new principles in the FRG, France, Japan, and a number of other developed countries. This is the result of the ambitions of the Ministry of the Aviation Industry.

From our point of view, it is necessary to rid the State Committee for Science and Technology of departmental influence and give it legitimate functions. Let's say, create under it a "brain center" combining the State Committee for Inventions and Discoveries and head institutes, which must not be sectorial, as they are now, but problem-solving institutes, so that they would work not for the sector, but for a technical direction. Then the State Committee for Science and Technology would be able to conduct an objective technical ideology, independent of departmental influence, and create initiative groups and creative collectives capable of carrying out fundamentally new tasks of scientific and technical progress.

This idea is by no means new. There has been much talk about the need for such a reorganization. But the new promising directions have not yet been given a chance. Unfortunately, such has also been the case with the airships.

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